NETWORK WORLD

The Newsweekly of User Networking Strategies

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US Sprint launches new service blitz

By Bob Wallace
Senior Editor

KANSAS CITY, Mo. — As expected, US Sprint Communications Co. last week introduced a new series of digital services, including fractional T-1, a family of digital data services (DDS) and a digital alternative to analog trunks used for applications such as tie lines.

The services, Clearline Fractional 1.5, Clearline Digital Data Services and Clearline Voiceband, complement the carrier's Clearline 1.5 T-1 service announced in January 1988.

With the introduction of Clearline Fractional 1.5, US Sprint joins a growing list of carriers offering fractional T-1 services, including AT&T, Williams Telecommunications Group, Inc. and Cable & Wireless Communications, Inc.

MCI Communications Corp. plans to announce fractional T-1 service next month.

Rounding out the line

The services fill in the gap between the highest speed DDS available — 56K bit/sec — and 1.544M bit/sec T-1 services. Fractional T-1 services enable customers to lease groups of 56K or 64K bit/sec channels.

US Sprint will offer Clearline Fractional 1.5 in 56K bit/sec

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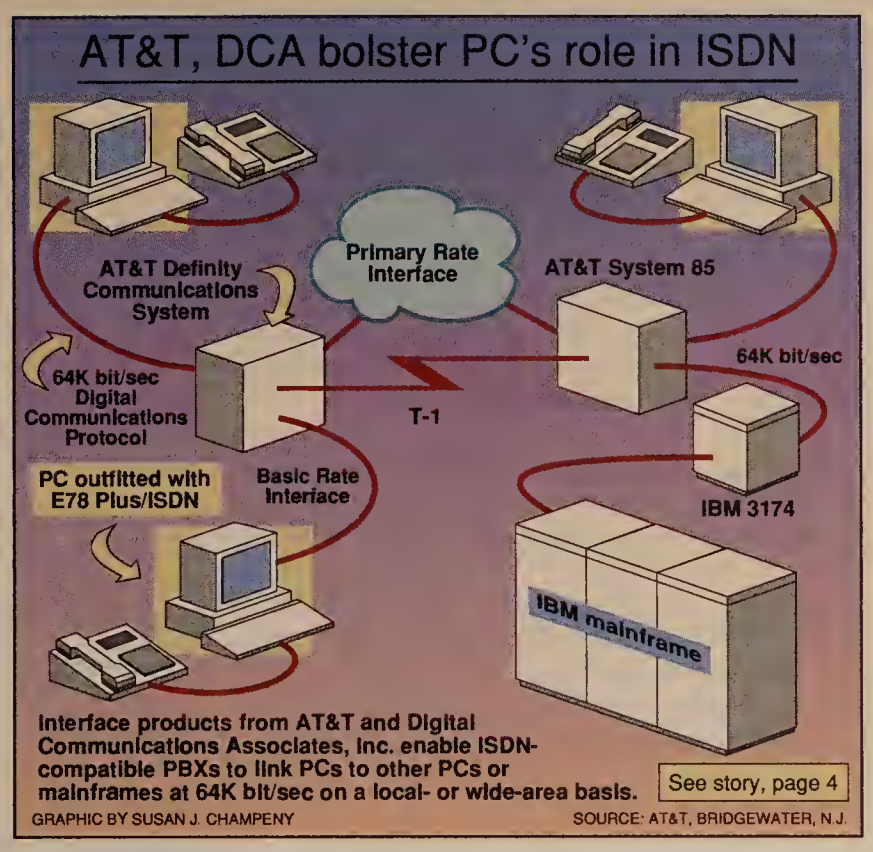

Users debate strategy of farming out net control

The big question: Can you turn over day-to-day net operations and still gain a strategic edge?

By Barton Crockett
Senior Editor

Despite the conventional wisdom that users need to personally control networks to use them for strategic advantage, many large companies are farming out management of network operations.

Pursuit of such deals has raised a fundamental question about whether large companies need to manage the day-to-day operations of their networks to gain competitive advantages from information systems.

Among companies advocating this reasoning is Merrill Lynch & Co., Inc., which earlier this month signed a letter of intent to have MCI Communications Corp. and IBM build and operate a new network management system to monitor and control the firm's global network ("Merrill Lynch to farm out its net management duties," *NW*, Sept. 11).

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IBM serves up SAA development strategy

AD/Cycle weds PCs and hosts in cooperative application building; the repository is unveiled.

By Paul Desmond
Senior Writer

NEW YORK — IBM last week introduced its long-awaited repository, which it positioned as a key element in a new application development strategy that promises to speed production of SAA-compliant applications.

As part of its AD/Cycle strategy, IBM and other companies will provide software development tools designed to help users in each phase of building applications that conform to its Systems Application Architecture (SAA). SAA promises to ease integration of disparate computing environments by simplifying the development of applications that can run on a range of processors.

Chief among the new AD/Cycle tools is the Repository Manager/MVS, which is a central storage facility for application development information.

AD/Cycle is based on a cooperative processing approach that positions the Personal System/2 running OS/2 Extended Edition as the primary development platform. Many AD/Cycle tools will run on workstations, allowing developers to design, write and maintain applications at the workstation level and access other host-based tools. The host would also be used to store data and compile code.

In addition, workstations can be linked in an IBM OS/2 LAN

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INSIDE
Vendor/user relationships start with the RFP, page 63.

Big carriers do battle on billing turf

By Bob Brown
and Gail Runnoe
Network World Staff

As the Big Three long-distance carriers become more evenly matched in pricing and quality of service, billing is emerging as a major battleground on which large user contracts are won and lost.

Communications managers overseeing networks built on a complex, widening array of voice and data services are looking for new ways to access, analyze and manipulate billing information to control costs and maximize network efficiency.

Recognizing that need, AT&T, MCI Communications Corp. and US Sprint Communications Co. are moving to provide a variety of new billing options. US Sprint recently unveiled a personal computer-based billing tool, and its

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NETLINE

NEWSPAPER

FEATURE

CCS7 a sure foundation for expanded net services

By Michael Gawdun
Special to Network World

One of the most significant changes occurring in the public switched telephone network today is the wide-scale deployment of Common Channel Signaling System 7 (CCS7). This out-of-band, message-based network uses the ANSI Signaling System 7 (SS7) protocol to relay messages between network switching nodes.

CCS7's architecture can increase network capacity because its higher speed reduces call setup and disconnect times by 40% to 60%. The new signaling system is the foundation upon which carriers will strengthen network signaling to provide services such as alternate billing, 800 services, virtual private network offerings, calling-card verification, Custom Local Area Signaling Services (CLASS) and a host of future offerings.

Two technical factors are

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Vendors poised to unleash FDDI products at Interop

Show to feature interoperability demo of TCP/IP running on multivendor, 100M bit/sec FDDI net.

By Susan Breidenbach and Laura DiDio
Network World Staff

SAN JOSE, Calif. — Analyst predictions that the Fiber Distributed Data Interface (FDDI) market would heat up in the fourth quarter of this year appear to be coming true. A spate of vendors are readying products to roll out at the Interop '89 conference here next week.

The Interop show — intended primarily as a showcase for Open Systems Interconnection, Transmission Control Protocol/Internet Protocol and X/Windows technology — will feature an interoperability demo showing TCP/IP running across a multivendor, 100M bit/sec FDDI net (see "Companies set to introduce FDDI routers," page 106).

The participating companies are Advanced Micro Devices, Inc. (AMD), Communication Machinery Corp, FiberMux Corp., Hewlett-Packard Co.'s Apollo Division, Network Systems Corp., Silicon Graphics, Inc., Sun Microsystems, Inc., Prime Computer, Inc., Unisys Corp. and the National Science Foundation.

"People thought that interoperability at [the lower layers of network architectures] was a solved problem, but it's not," said Dan Lynch, president of Advanced Computing Environments, Inc. of Mountain View, Calif., the organization that stages Interop. "The speed issue is really tough. We've helped the vendors get rolling by giving them a hurdle, and they are now

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AT&T offers EDI billing, new net control services

Unveils Accumaster Net Management Services.

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T last week introduced Accumaster Network Management Services (NMS), a series of new and enhanced on-line services customers can use to manage switched and dedicated transmission facilities.

Under the Accumaster NMS banner, AT&T also announced an electronic data interchange billing option for customers of its Software-Defined Network (SDN) and private-line services.

Users can access the data provided by the new services using stand-alone workstations or terminals, or through the Accumaster Consolidated Workstation, a device that supports management of a variety of network services.

In addition, the services can be controlled through Accumaster Integrator, which gives users the ability to monitor and control a variety of network management products.

The minicomputer-based Ac-

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AT&T files Tariff 12 deals for three more big users

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T expanded its efforts to lock up the business of big users with Sept. 15 filings of multimillion-dollar custom net deals for J.C. Penney Co., Inc., MasterCard International, Inc. and Unisys Corp.

If approved by the Federal Communications Commission, the contracts would bring the number of AT&T Tariff 12 custom net users to 16. The values of the contracts varied widely, with J.C. Penney signing the fourth largest Tariff 12 deal to date, and MasterCard entering into one of the smallest.

J.C. Penney's contract is worth a minimum of $31.8 million annually for five years, and MasterCard signed a deal worth at least $5.8 million annually for three years. Unisys, which announced earlier this month that it had signed a contract with AT&T, will pay a minimum of $16 million annually for the next five years ("Unisys picks custom net to slash costs," *NW*, Sept. 18).

AT&T continues to show its willingness to deal with customers in order to win business. For example, Unisys negotiated rates that will cut its voice costs by 70% and reduce its data transmission costs by 30% while doubling network capacity. The company also signed up for a customized billing plan that will enable it to track

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Briefs

Integrator deal. Unisys Corp. and AT&T will announce today a comarketing agreement through which Unisys will sell AT&T's Accumaster Integrator network management system, a source close to Unisys said last week. Accumaster Integrator is the key component of AT&T's Unified Network Management Architecture. It enables users to monitor and control multivendor network management systems that oversee net equipment and services. Details of the deal were not available.

SQL Server marketing mavens quit. Much-beleagured Ashton-Tate Corp. received another blow last week when two key members of its SQL Server marketing team unexpectedly quit. SQL Server Sales Director Jim Reilly and his top lieutenant, John Kish, are reportedly headed for Oracle Corp., which is attempting to launch a competing microcomputer-based data base server.

System One offers net discounts. System One Corp. last week said it has begun offering discounted MCI Communications Corp. DialOne long-distance telephone services to travel agencies subscribing to its computer reservation network.

Travel agencies will receive discounts of 10% to 25% off regular MCI rates, depending on the amount of usage. System One said it is the first reservation network company to offer voice service.

System One is reportedly up for sale by parent company Texas Air Corp.

GM speaks; IBM and DEC listen. IBM and Digital Equipment Corp. have been slow to jump on the Manufacturing Automation Protocol 3.0 bandwagon, but they are apparently bowing to pressure from General Motors Corp.

Sources say GM has told the nation's two largest computer manufacturers that nothing less than MAP 3.0 will do. DEC will deliver MAP 3.0 products to GM in the next six weeks, and IBM is close behind, sources said.

Northern Telecom to demo ISDN link. Northern Telecom, Inc. will demonstrate an Integrated Services Digital Network-Applications Protocol (ISDN-AP) software link between its Meridian SL-1 private branch exchange and IBM's Application System/400 at the Tele-Communications Association, Inc. conference in San Diego this week.

The ISDN-AP software handles transport of control instructions such as call setup and teardown between the Meridian SL-1 PBX and the computer — an IBM AS/400. The linkage serves as the foundation for the creation of PBX-to-computer applications that integrate voice and data at the desktop.

3Com avoids loss, but earnings fall. 3Com Corp., which last month warned analysts about the possibility of a first-quarter loss, last week reported that it actually posted a profit for its first fiscal quarter, ended Aug. 31. Revenue grew roughly 8%, to $89.1 million for the first quarter from $82 million during the first quarter last year. However, earnings fell sharply to $1.2 million from $7.1 million for the first quarter last year.

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PC ISDN interface supports 64K links through PBXs

Products developed in conjunction with DCA.

By Paul Desmond
Senior Writer

BRIDGEWATER, N.J. — AT&T and Digital Communications Associates, Inc. (DCA) last week introduced a personal computer ISDN Basic Rate Interface that supports communications with other microcomputers and mainframes at 64K bit/sec.

The interface, called the BRI card, uses IBM 3270 emulation and file-transfer software developed by DCA under a strategic alliance to establish links with local and remote devices through Integrated Services Digital Network-compatible telephone switches.

The software, E78 Plus/ISDN for AT&T, is also compatible with AT&T's Digital Communications Protocol (DCP), a Basic Rate Interface-like proprietary line-coding scheme.

Together, the products provide a number of connection options for personal computer users that need high-speed access to one another's systems or to mainframes, said Roger Boyce, AT&T's product manager for data integration products.

Personal computer users can establish 64K bit/sec links to microcomputers and mainframes attached to the same AT&T private branch exchange, or they can access machines tied to a remote PBX via a T-1 or ISDN Primary Rate Interface wide-area link. An AT&T 3270C data module is required to convert Basic Rate Interface and DCP signals into a 3270 data stream for communications with IBM hosts through a cluster controller.

As long as the controller is channel-attached to the mainframe or attached via a Token-Ring local network to a front-end processor, the full 64K bit/sec data rate is maintained from the

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Unisys package gives DCP peer functionality in SNA

By Jim Brown
Senior Editor

BLUE BELL, Pa. — Unisys Corp. last week released a new version of its SNA/net software that lets its Distributed Communications Processor (DCP) emulate an IBM front-end processor.

SNA/net Version 3R1 makes the DCP appear to IBM hosts as a PU Type 5, meaning the DCP and IBM front-end processors can communicate as peers. Unisys uses DCPs to control communications within its Distributed Communications Architecture.

Earlier versions of SNA/net made the DCP appear to IBM front ends as a PU 2 device, such as a cluster controller in IBM's Systems Network Architecture.

As with earlier versions of SNA/net, the software enables Unisys terminals, supported by a DCP, to access an IBM front end as 3270 devices. Conversely, IBM 3270s, supported by a front end, can access a Unisys 1100 or 2200 mainframe through a DCP as if they were Unisys terminals supporting Unisys' Universal Terminal System (UTS) protocol.

With the new PU 5 capability, terminals attached to an IBM front end no longer have to get permission from an IBM host to access DCP-attached resources, as was the case with PU 2.

Now, if an IBM host fails, IBM terminal users can be routed directly to a DCP, meaning Unisys hosts can back up IBM machines.

"The 3745 will treat the DCP running SNA/net as if it were another 3745," said Brian Pickersgill, program manager for DCA and DCP program products. "And it will treat the data coming across the link as if it came from a 3270 or 3770 SNA environment."

Other enhancements

SNA/net Version 3R1 enhancements enable DCPs to work with the latest versions of IBM's Network Control Program (NCP) and VTAM software. It now supports links to IBM front ends running NCP Versions 3, 4.1, 4.2, 5.1 or 5.2, which are supported by IBM hosts running VTAM Versions 2 or 3.

Other enhancements include the ability to run SNA/net on a DCP that is also running Transmission Control Protocol/Internet Protocol and Open Systems Interconnection protocol software. This means DCP-attached terminals can access a Unisys host or devices in SNA, TCP/IP or OSI networks from the same controller. Previous versions of SNA/net had to be run on a dedicated DCP.

The new release also adds new network management capabili-

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Bytex plans TCA rollout of T-1-ready matrix switch

By Jim Brown
Senior Editor

SAN DIEGO — Bytex Corp. this week plans to roll out a matrix switch that enables users to switch T-1 lines from a failed device to a live unit.

The vendor will make the announcement at the Tele-Communications Association, Inc. show here this week, where it will also announce enhancements to its matrix switch management software.

The new Digital Network Switch (DNS) supports as many as 34 ports, each of which can support a T-1 line. DNS is the first Bytex product to support only T-1 lines. The company's Unity 10, Unity 30 and Unity 50 matrix switches are designed primarily to support lower speed voice or data lines, and a limited number of T-1 lines.

Users attach T-1 lines to ports on one side of the unit, while devices such as IBM mainframe channel extenders, local net bridges, front-end processors and private branch exchanges that support a direct T-1 interface are connected to the private network side.

A DNS operator can instruct the switch to connect a premises-based device to any of the T-1 lines on the public network side or a T-1 line to any of the private network devices. This enables users to switch a T-1 line from a failed front-end processor to a functional one, for example.

Users can also attach T-1 multiplexers to ports on the premises side, which allows them to cut traffic over to a backup T-1 line in the event a primary T-1 circuit fails.

Additionally, the DNS allows network operators to test and monitor incoming T-1 lines for bit error rates and line jitter. It lets operators view the bit streams of each of the 24 64K bit/sec channels that constitute a T-1 line to ensure they meet the user's specifications.

By monitoring line conditions, users can reroute traffic to overcome circuit degradation or outages. Operators can also use the DNS to route traffic from a site with failed computer equipment to one with functioning equipment. Users control the DNS via a terminal attached to a diagnostic port or a Unity Management System, an IBM Personal System/2-based management console running Bytex's Unity Management software.

The DNS also includes a built-in data service unit function that formats the T-1 line signal to comply with the physical interface requirements, such as V.35, at the receiving device.

"Until now, there really hasn't been a centralized place to bring all the T-1 lines in and provide this kind of switching and testing," said George Kushin, vice-president of marketing.

Analysts agreed with that assessment, saying they have yet to

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System One on the block, EDS a bidder

By Bob Brown
Senior Editor

HOUSTON — Texas Air Corp. is reportedly negotiating to sell its System One Corp. reservation network subsidiary to Electronic Data Systems Corp. (EDS) for an estimated $400 million, industry sources said last week.

Separately, Delta Air Lines, Inc. said it is discussing a merger of its Datas II computer reservation network with the PARS network, operated jointly by Northwest Airlines, Inc. and Trans World Airlines, Inc. The companies are trying to expand the reach of their reservation systems and benefit from economies of scale in networking.

According to industry analysts, Texas Air's negotiations with EDS are at an advanced stage, although the firms declined to acknowledge that talks are being held. EDS is owned by General Motors Corp. (see "EDS sows seeds of future profit in post-1992 Europe," page 33).

Sources said they were not surprised Texas Air is trying to unload System One, given the air carrier's ongoing financial woes and the possibility of a shakeout in the highly competitive reservation network industry.

They said the company may be looking at the sale of System One as a way to raise capital. The firm has had a long string of quarterly losses, and its strike-hampered Eastern Air Lines, Inc. unit is in bankruptcy proceedings. Frank Lorenzo, controversial chairman of Texas Air, said last month he is considering selling an interest in the firm's Continental Corp. airline unit.

Financial problems have taken their toll on System One. Late last year, Texas Air executives scrapped System One's plans for a $30 million nationwide T-3 network ("System One bounces back in tight times," *NW*, Aug. 14). In January, Texas Air laid off or transferred some 400 System One employees.

EDS reportedly is moving to reduce its financial dependence on GM by expanding into new business areas such as the reservation net arena. EDS provides systems integration and network services to a variety of companies and oversees GM's internal net.

If EDS acquires System One, it would mark the first time a reservation network would be run solely by a company outside the airline industry. That would probably eliminate Justice Department concerns about network bias toward any particular airline and would bode well for government approval of the deal.

System One is currently the third largest airline reservation system, supporting some 8,000 travel agencies. However, the proposed merger of Delta's Datas II and PARS would knock System One out of the third slot.

Industry watchers said that by merging, the firms could compete more effectively against the two largest reservation systems — the Covia Partnership, dominated by majority owner United Air Lines, Inc., and SABRE, which is owned by AMR Corp., parent of American Airlines, Inc.

Bigger is better in the airline reservation business, industry watchers said. Delta, Northwest and TWA will achieve economies of scale by operating a larger network, gain access to more travel agents across the U.S. and collect more information that will help them operate more efficiently.

The deal makes sense for the participating airlines since it would expand the geographic base of the two reservation nets, said Sam Fuchs, an associate at the Waltham, Mass., office of Simat, Helliesen & Eichner, Inc. Datas II is used mainly by travel agents in the Southeast, near Delta's Atlanta headquarters, and PARS is used primarily by travel agents in other parts of the U.S.

Earlier this year, Delta and American announced plans to merge Datas II and SABRE. But the Justice Department derailed the plan, saying it would file an antitrust suit to block the deal ("Competition forcing travel nets to merge," *NW*, July 17). The plan subsequently fell apart.

The current reservation net proposal stands a better chance

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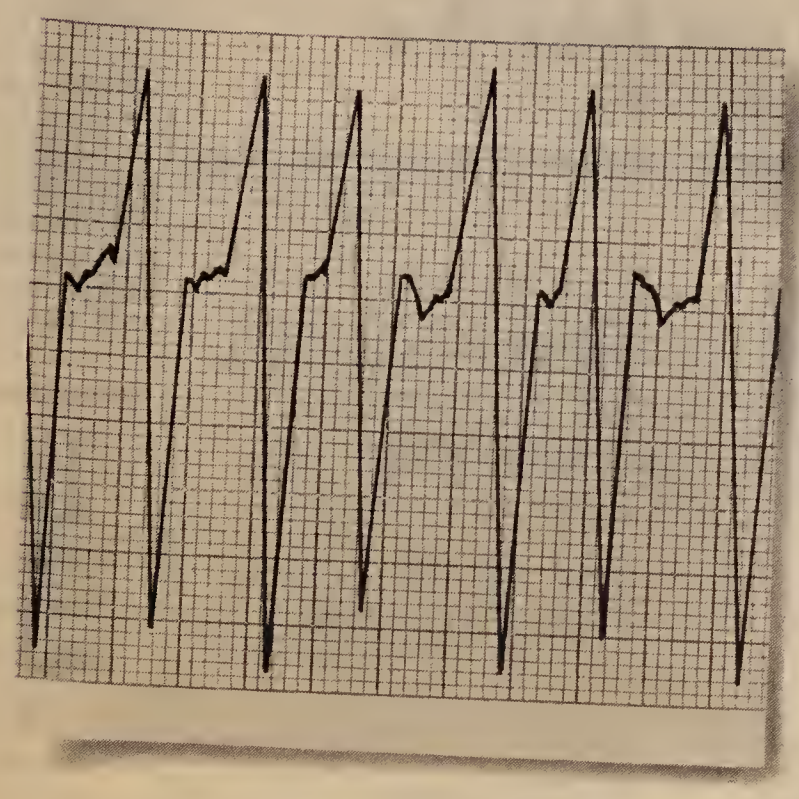
"My doctor told me to cut down my stress. So I switched long distance companies."



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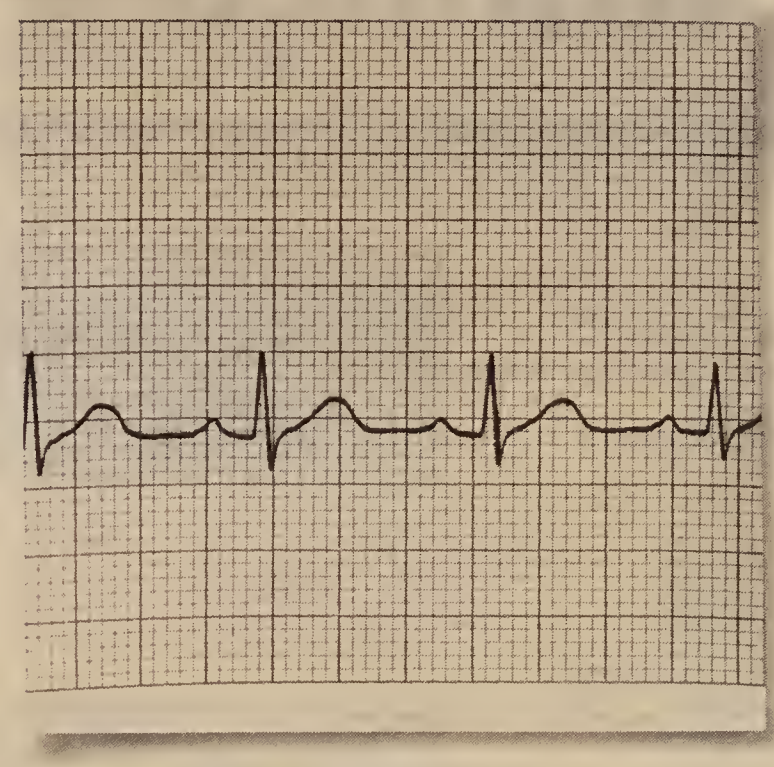

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COMMUNICATIONS SERVICES VIA ITT

Firm speeds delivery of ads through satellite net

By Wayne Eckerson
Staff Writer

NEW YORK — AD/SAT is using a satellite net and high-resolution facsimile machines to deliver advertisements to major newspapers faster and often at less cost than via courier services.

The 3-year-old company currently transmits black-and-white and color ads to 123 newspapers, including such giants as *The New York Times*, *USA Today* and *The Los Angeles Times*. Hundreds of advertising agencies and national retailers, such as Bloomingdale's and Lord & Taylor, are using AD/SAT's service to reduce the costs of distributing ads to multiple locations and to make last-minute changes or deliveries.

Using its nationwide satellite network, AD/SAT transmits ads from high-resolution facsimile machines in its offices in New York, Chicago and Los Angeles to similar fax machines it has installed in newspaper plants across the country.

According to Buddy Hayden, president of AD/SAT, many newspapers use the same technology to transmit editorial copy to geographically dispersed printing plants.

"We took an existing technology and applied it to a new market with good results," he said.

AD/SAT's fax machines create

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Unisys gives DCP functionality

continued from page 4

ties and support for IBM's Binary Synchronous Communications protocols.

The network management enhancement expands the amount of information available to network operators in Unisys Distributed Communications Architecture environments. One of the new features is improved session tracking, which makes it easier for net operators to isolate faults in the link used to connect DCPs to IBM front-end processors.

BSC support was added by bundling Unisys' Foreign Domain BSC feature into SNA/net. That feature enables IBM front-end processor-attached BSC terminals to access a DCP-attached Unisys 1100 or 2200 mainframe.

Unisys also announced it has upgraded a pair of optional software packages to run with SNA/net 3R1.

SNA/net NPSI enables a DCP to emulate an IBM front end that supports IBM's Network Control Program Packet-Switching Interface software. This makes it possible for the DCP to communicate with other SNA nodes via public packet-switched facilities. The package requires the DCP to be running Unisys' DCP X.25 Packet-Switched Communications Software.

> The enhancement expands the amount of information available to network operators in Unisys DCA environments.
>
> ▲▲▲

The company also upgraded its SNA/net Remote Batch File Transfer Extended (RBFTE), software that allows DCP-attached hosts to use IBM's 3770 remote job entry protocols to communicate with batch facilities, such as JES2 or JES3, running on IBM hosts. This enables Unisys and IBM hosts to support peer-to-peer file transfers.

SNA/net and the two options are available now under a five-year or monthly license plan.

The cost of the software varies according to the DCP model used. Five-year fees for SNA/net range from $21,140 to $60,400, while monthly fees range from $468 to $1,342.

The five-year fee for the SNA/net NPSI package costs between $3,605 and $10,300, while the monthly fee ranges from $80 to $229. The five-year fee for SNA/net RBFTE is between $2,325 and $6,380, while the monthly fee is between $52 and $142.

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General DataComm

See The Faxnet Form On Page #79.

Worth Noting

Ameritech is the most passive of the regional Bell holding companies, and BellSouth Corp. is the most aggressive when it comes to pursuing business opportunities abroad, says Mark Lowenstein, an analyst at Boston-based The Yankee Group. Lowenstein authored a report titled, "RBOC Overseas Ventures: Exploring New Frontiers." For more information, call (617) 367-1000.

People & Positions

Apple Computer, Inc. of Cupertino, Calif., last week named **Ian Diery** corporate senior vice-president and president of **Apple Pacific** as of Oct. 16.

Diery will be responsible for Apple's marketing, sales and support operations in Australia, Canada, Japan, the Far East and Latin America. He will report directly to **John Sculley,** chairman and chief executive officer at Apple.

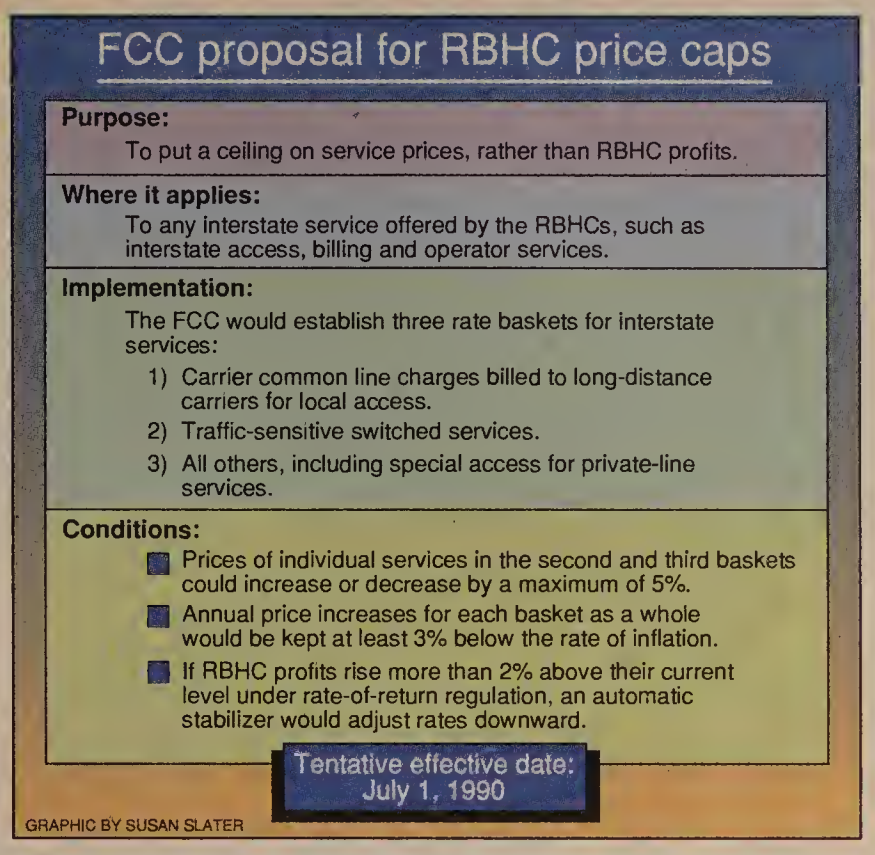
Diery will replace **Delbert Yocam,** currently corporate senior vice-president and president of Apple Pacific.

Previously, Diery was executive vice-president of worldwide field operations at Wang Laboratories, Inc. of Lowell, Mass.

Howard Crane last week was named president of **MCI Communications Corp.**'s Pacific division. Crane will be based in San Francisco and direct all MCI operations in California and Nevada.

Previously, he was senior vice-president of corporate affairs for the Washington, D.C.-based carrier.

Crane succeeds **Harold Trimmer,** who will take on a new job at MCI to be announced shortly.



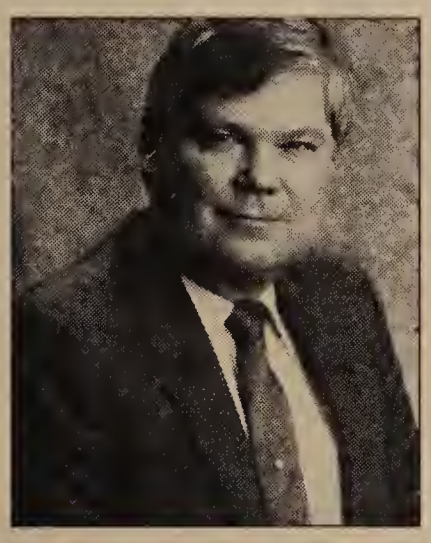
Users fear hikes in private-line rates

Users, carriers split on price cap plan; some say carriers might learn to operate more efficiently.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — If price cap regulation is imposed on the RBHCs under the current FCC plan, users say rates for private-line and other special access services would increase as the carriers attempt to migrate customers onto the public network.

Price caps would set limits on what the regional Bell holding companies can charge for services, instead of limiting their profits, as under current rate-of-return regulation. The plan is designed to give carriers an incentive to operate more efficiently by allowing them to earn potentially higher profits.



Nynex's Frank Gumper

Earlier this year, the Federal Communications Commission approved a price cap plan for AT&T that took effect in July. The FCC is considering implementing a similar plan for regulating RBHC interstate services that would take effect in July 1990.

Users and carriers are split on the potential impact of price caps for the local exchange carriers.

Jeffrey Linder, a Washington, D.C. attorney for the Tele-Communications Association, Inc. (TCA), said the RBHCs will price switched access services more attractively than special access services in order to protect their investment in the public network.

If a large number of people leave the switched network to take private-line service, he said, "the phone companies will be left with a stranded investment."

Although, in some areas, alternative carriers compete with the RBHCs to provide users with private-line services, these carriers are "very, very limited in the number and scope of service offerings," and do not provide sufficient competition to keep RBHC rates in check, said Michael Senkowski, also an attorney with TCA.

Senkowski said that under the proposed price cap plan, "you can expect significant increases in areas where the RBHCs do not face effective competition."

Users are also concerned that net quality could decrease under the price cap plan. Linder said that with a short-term incentive to cut costs — in order to maximize profits — the carriers could choose to defer net maintenance.

Telecommunications Users for Regulatory Fairness (TURF) — a coalition of users groups including the TCA, the International Communications Association (ICA), the Ad Hoc Telecommuni-

(continued on page 16)

AT&T goes full tilt with anti-MCI Fax ad campaign

AT&T attacks quality, reliability of fax service.

By Bob Brown and Gail Runnoe
Network World Staff

BOSTON — AT&T has undertaken an aggressive campaign blasting the reliability and value of MCI Communications Corp.'s dedicated facsimile network.

MCI Fax, unveiled late last year, was billed by MCI as a high-quality, cost-effective way for users to send facsimiles and take advantage of advanced fax capabilities, such as document store-and-forward. MCI says MCI Fax services are provided over a dedicated portion of its long-haul network ("MCI unveils dedicated fax network," *NW,* Nov. 7, 1988).

The carrier said more than 20,000 users have signed up for MCI Fax services to date.

Intent on destruction

In its new advertising campaign, "The Fax Myth Destroyed," AT&T claims that sending fax copies via MCI Fax is less reliable and more expensive than sending them over AT&T's regular network. According to its copy, the confrontational ad is "the fifth in a series to help set the record straight" on a variety of AT&T services.

The ad cites findings from a study conducted in nine cities last spring by AT&T Bell Laboratories, AT&T's research arm. In the study, AT&T Bell Labs evaluated transmissions by the following criteria: call setup time, number of calls completed, speed at which the document was transmitted, error rate, acceptability of transmissions and number of retransmissions needed.

The research, which involved transmission of five-page faxes, stated that the MCI Fax network sends one unreadable fax page out of every 12. The study also found that the MCI Fax network requires 57% more retransmissions of partially unreadable fax copies than does AT&T's regular long-distance network.

The AT&T ads say users can save money by combining fax and voice traffic over the AT&T network, thus reaping monthly volume discounts. For example, the AT&T Bell Labs study showed that users of AT&T's regular long-distance service could save up to 16% over MCI Fax, while users of AT&T's Software-Defined Network could save as much as 56% over MCI Fax through bulk discounts.

AT&T questions why anyone would want to send faxes over any network other than their existing voice or data network, said James Borger, AT&T's district

(continued on page 13)

INDUSTRY BRIEFS

The **Audio Messaging Interchange Specification (AMIS)** project group, whose goal is to develop a specification for internetworking multivendor voice mail systems, will meet this week in an effort to approve two proposed specifications.

AMIS will hold meetings on Sept. 28 and 29 in conjunction with the Tele-Communications Association, Inc. show in San Diego. It will also hold a press conference to answer questions about the group's progress.

AMIS, which has about 35 user and vendor members, will vote on a finalized version of a robust protocol for digital communications between voice-messaging systems and a no-frills protocol for analog communications between voice-messaging systems, according to one member of the group.

If the protocols are approved, AMIS will seek approval by a standards organization, such as the Consultative Committee on International Telephony and Telegraphy, a group member said.

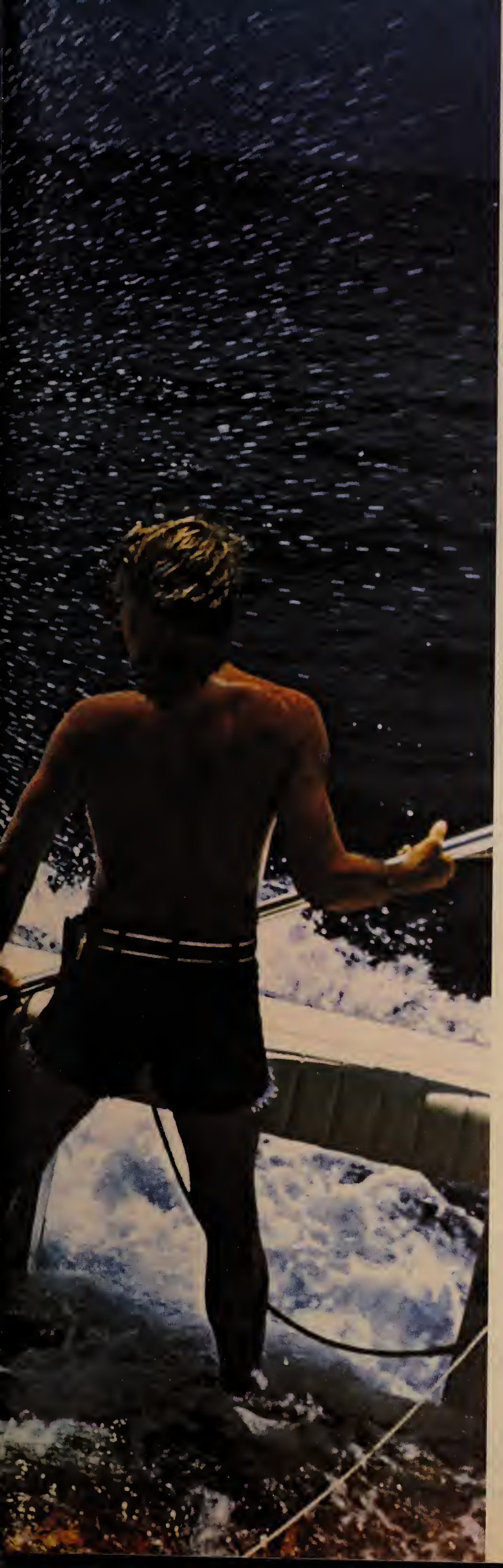
The Mexican government last week said it will sell its majority stake in **Telefonos de Mexico,** the country's financially troubled and inefficient telephone monopoly, to private interests.

The government said it is hoping a private company can modernize the network and make it profitable.

Andres Caso Lombardo, Mexico's Minister of Communications and Transport, said the Mexican government also plans to end the company's monopoly in certain service areas.

The government did not reveal how much of its 51% stake in

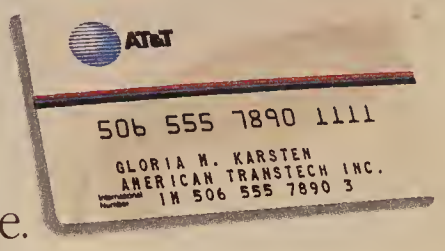
(continued on page 16)



Instead of spending your time fishing through your calling card charges, now you can spend your time fishing.

Introducing AT&T Card EXECU-BILL℠ service. A flexible new billing service that gives you a more efficient way of tracking and managing your AT&T Card usage.

With AT&T Card EXECU-BILL service, you can tailor your billing to suit the way your company works. For example, you can specify which departments and individuals get bills or reports and what information you want them to have. You can even get special reports to summarize charges or flag heavy card usage.



What's more, you get a variety of monthly management reports that help you administer your corporate card program, analyze charges and identify abuse.

AT&T Card EXECU-BILL service also comes with options such as usage data on magnetic tape and custom card design. You choose how and where you want your cards distributed and can easily add or deactivate cards.

But that's not all.

With EXECU-BILL service, you're sure you're getting AT&T, the most reliable network in the world. Plus, of course, the ease and convenience of the AT&T Card. And you're guaranteed AT&T's consistent low prices with no surprises.

All of which means with AT&T Card EXECU-BILL service, you'll have better control over your calling card expenses. Not to mention how you spend your time.

For more information, call your AT&T Account Executive or 1 800 222-0400.

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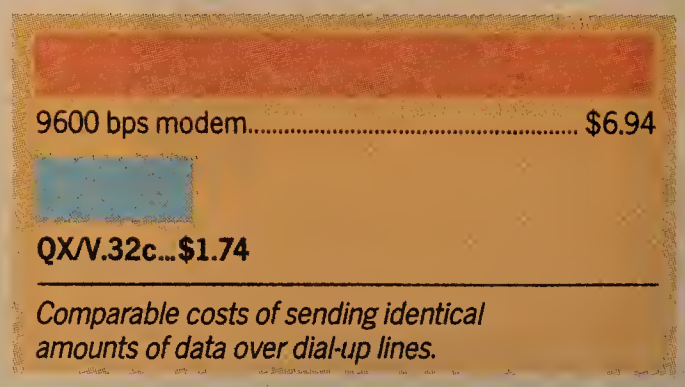
What will you pay for our breakthrough V.32 modem? About the same as modems with only half the error-free throughput. As you can see from the chart, lower phone bills alone could pay for this upgrade.



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See The Faxnet Form On Page #79.

Sikes seeks Congress' aid in getting FCC more funds

Says the FCC is up against some major issues.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — FCC Chairman Alfred Sikes has appealed to legislators for help in getting the funding needed for the agency to deal with high-priority issues in the next two years.

According to Sikes, among the more important proceedings the Federal Communications Commission is involved with are examining whether to implement price cap regulation for the regional Bell holding companies and investigating the level of competition in the long-distance market. That investigation could lead to modifications in regulatory policy, including a change in AT&T's dominant carrier status.

He said the FCC must also work with Congress to develop safeguards that will allow the lifting of Modified Final Judgment business restrictions on the RBHCs.

Sikes made the remarks to the U.S. House Subcommittee on Telecommunications and Finance during a recent authorization hearing. The hearing was held to determine the FCC budget for the 1990 and 1991 fiscal years. Sikes requested $109.8 million for 1990, up slightly from 1989, and $121.5 million for 1991.

However, Sikes said those amounts would be only adequate. "A cursory look makes it patently obvious that demand for the services of the FCC is going up and the resources in real terms have gone down," he said.

The subcommittee agreed to Sikes' 1990 budget request but cut the 1991 funding level to $117.8 million. The subcommittee still has to negotiate with the appropriations committee to get the money.

The FCC funding issue has sparked heated debate over the last few years as technologies such as cellular telephony have expanded the scope of the agency's responsibilities while appropriations have dwindled. Funding problems have stemmed in large measure from the stormy relationship between Congress and the past two FCC chairmen, Dennis Patrick and Mark Fowler.

The result has been a loss of 237 FCC staff members over the last five years and a lack of resources, including office automation and communications technology. Sikes said it was

FCC's Alfred Sikes

"laughable" that the premiere agency overseeing the communications industry still has 90% of its staff using rotary dial telephones.

Although the subcommittee has not committed to authorizing the FCC's full budget request, Sikes seems to have made headway in convincing lawmakers that the lack of funding is hampering the agency.

Subcommittee Chairman Rep. Edward Markey (D-Mass.) told Sikes that he recognized it was critical for the FCC to have proper resources.

"It is no longer acceptable for the commission to endure 25% staff cutbacks at a time when its mission and responsibilities are expanding," Markey said.

Critics have long charged that the FCC does not have enough resources to carry out its fundamental responsibilities. A number of leading members of the subcommittee expressed similar fears, saying they were particularly concerned that the FCC would be unable to do its job if asked to take on oversight of the Modified Final Judgment or additional price cap regulation.

Subcommittee members Rep. Al Swift (D-Wash.) and Rep. Thomas Tauke (R-Iowa) have introduced legislation that would allow the RBHCs to enter the currently prohibited areas of manufacturing and information services. The legislation would probably require the RBHCs to operate the new ventures through separate subsidiaries, and the FCC would be called upon to ensure that the carriers not fund these new ventures with revenues from their basic telephone operations.

Reps voice support

Swift said he has been concerned about inadequate FCC funding and has urged Sikes to tell the subcommittee how much money he would realistically need to take on oversight of the Modified Final Judgment.

"It's absolutely critical that if we write [Modified Final Judgment] legislation with adequate safeguards and you have the determination to implement it, [that we don't] starve the process to death for the proper resources," Swift said.

Tauke agreed that FCC oversight of the Modified Final Judgment would add significantly to the agency's work load and pledged to help obtain adequate funding.

Rep. Michael Oxley (R-Ohio) questioned whether the FCC's adoption of price cap regulation would overburden the agency.

"Theoretically, [price cap regulation] should lessen the burden. But as it has evolved, it has become increasingly complicated. So I'm just not prepared to say," Sikes responded.

Sikes said he has reserved judgment for now as to whether price cap regulation should be implemented for the local exchange carriers. He said it was uncertain that the agency would meet its deadline of July 1, 1990, for implementing the plan. Price cap regulation took effect for AT&T July 1.

AT&T goes full tilt with ad

continued from page 9

manager for strategic capability assessment.

"With AT&T, [users] don't need a specialized line," he said. "Our basic switched network is superior."

To the defense

MCI executives were quick to refute AT&T's claims.

The company contends that MCI Fax can save users money, compared with sending faxes via existing long-distance services. While AT&T bills users for fax transmissions just as it does for voice transmissions, MCI offers a special billing formula for fax transmissions that takes into account the brevity of fax calls, said Leslie Lampe, senior manager of the MCI Fax Business Center in Washington, D.C.

MCI Fax is priced according to a "fractional billing" formula that replaces conventional one-minute billing increments with an initial billing increment of 30 seconds and six-second increments thereafter.

As for reliability, MCI's own tests results were much different from those of AT&T Bell Labs, Lampe said.

MCI said it found that the two carriers were about even in reliability for faxes sent domestically. But for international transmissions, MCI said it had an 83.6% success rate, compared with a 76.3% success rate for AT&T, according to Lampe.

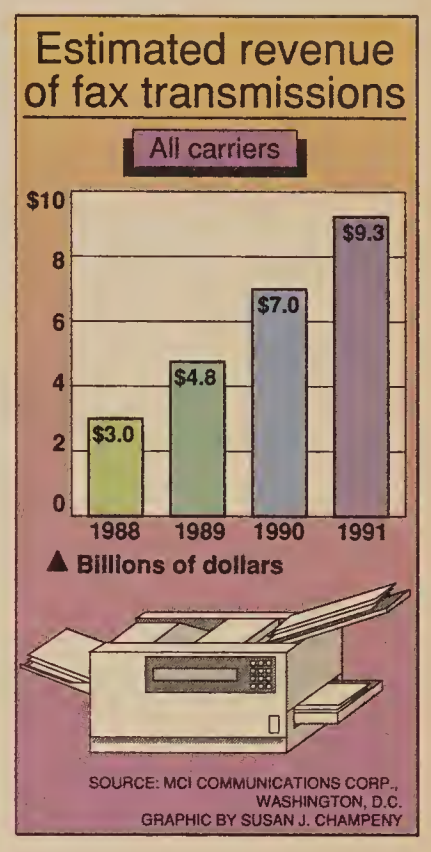
However, Lampe said MCI Fax's main selling point is its value-added features ("MCI Fax service a big hit with users, carrier claims," *NW*, Aug. 7).

She said MCI Fax's broadcasting feature, which allows for multiple distributions of fax copies with a single transmission, has met with widespread approval. About 70 users have signed up for the service, which was introduced in June, the carrier said.

According to MCI Fax network users interviewed by *Network World*, the service has met or exceeded expectations.

Weldon Sheffield, president of The Sheffield Co., a San Antonio, Texas-based grocery food distributor, said MCI Fax has helped his company trim its telephone bill and increase the productivity of its employees. The company faxes price lists of groceries to 350 retailers and warehouses daily, he said.

"Pricing is unimportant to me," Sheffield said. "My concern



is that the price lists get to where they are supposed to go. MCI Fax lets me keep track of the faxes my salespeople send out, and it frees the salespeople to do more useful jobs than standing over a fax machine for half a day."

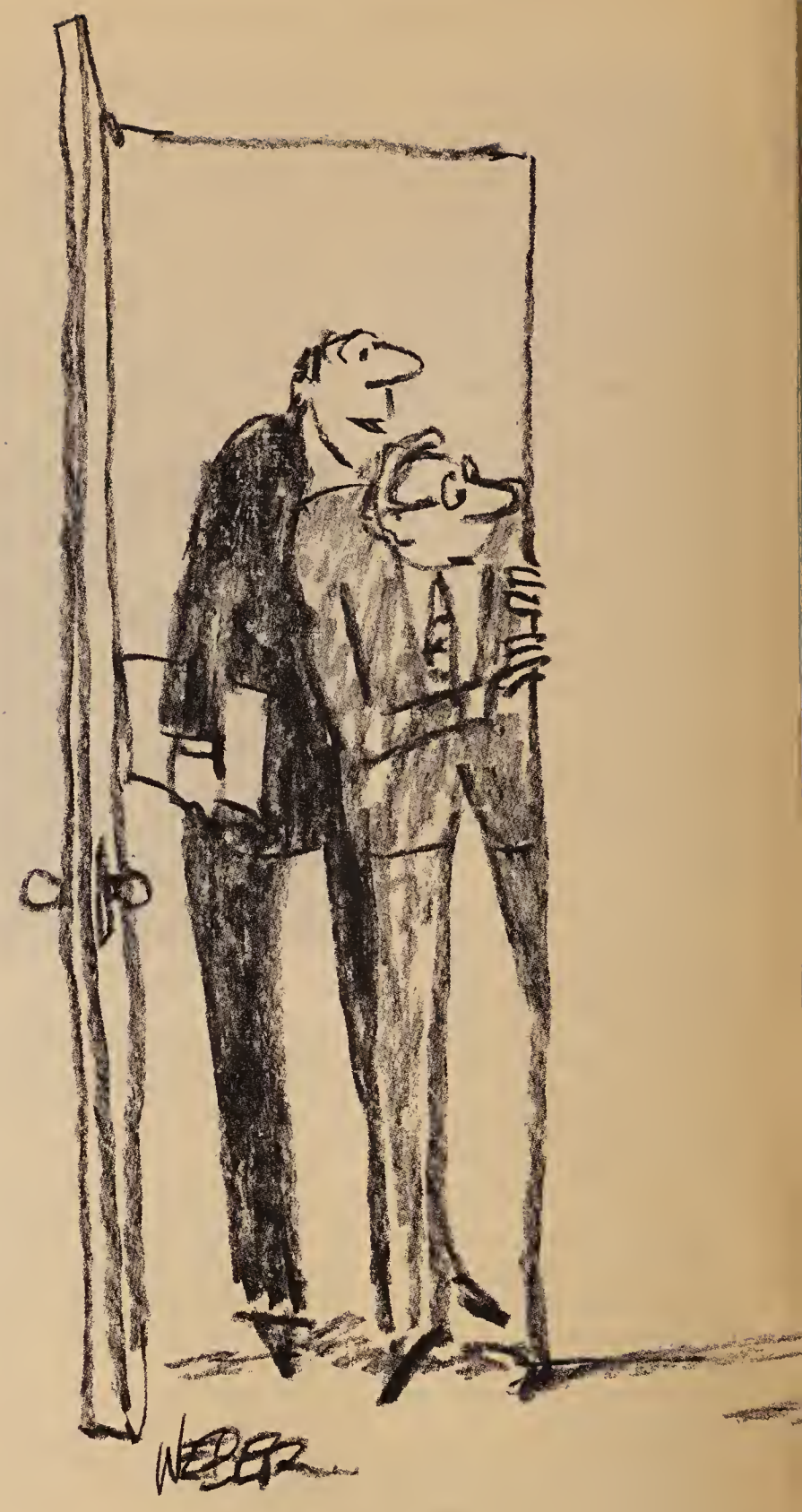
Lampe would not comment on whether MCI plans a counterattack in ads of its own. "That usually makes you look like you're on the defensive, and we're not," she said. "Look at this AT&T ad; now that's what I call defensive."

Lampe claimed that the AT&T ad has actually spurred interest in MCI Fax, which was advertised heavily when it was first announced but has been less so recently.

MCI Fax service representatives have received many phone calls from users who have seen the AT&T ads and say, "I didn't even know MCI had a fax network," Lampe said.

"AT&T's response has really validated what we're doing," she added. "It's given us a shot of adrenaline, too. MCI thrives on this sort of competition."

"When Fosberry said a PS/2 with Micro Channel would let him juggle ten things at once and still have time to break for lunch, he meant it."



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Users fear hikes in private-line rates

continued from page 9

cations Users Committee, the Consumer Federation of America and the Maryland People Council — said that, overall, the price cap plan would increase consumer costs by at least $4.1 billion over the plan's suggested four-year trial period. In its statement of principles, TURF said the proposed plan did not sufficiently constrain the RBHCs' "ability to cross-subsidize and to manipulate customers' service choices."

Brian Moir, counsel for the ICA, explained that because price caps would be based on current RBHC rates, the plan may actually prevent users from enjoying significant rate reductions.

He said RBHC prices are inflated because higher-than-normal capital investments made to increase network efficiency were put into the rate base after divestiture. Now that users have paid for these improvements and the carriers are realizing greater operating efficiency, limiting price reductions to 5% annually, as the plan would do, "would deny users the benefits of the capital investments," he said.

For their part, the RBHCs aren't saying that prices will drop below current levels under price caps. But they say that, on average, prices will be lower than what they would be if rate-of-return regulation continues.

John Millice, district manager of federal docket matters at Southwestern Bell Gorp., estimated consumers would save $800 million to $1.8 billion over a four-year period under price caps.

The RBHCs said they will not boost special access rates because competition would make that move impractical.

Hardy Moebius, director of regulatory research at Bell Atlantic Corp., said the carrier faces competition from alternative carriers in Washington, D.C., Philadelphia, Baltimore and northern New Jersey. "We don't have the liberty to jerk prices up in some areas so we can lower them in others," he said.

Ron Altman, chief executive officer at Altman, Brenner & Wasserman, a New York investment firm, agreed. If the RBHCs were to engage in such a pricing strategy, "they'd be bypassed like crazy," he said.

Under the proposed price cap plan, Altman said he believes users will see price decreases in special access services. "Special access prices will be dictated by the marketplace rather than legislation," he said.

Frank Gumper, director of regulatory policy at Nynex Service Co., said Nynex customers would probably see greater price decreases for switched services than for special access services. He said Nynex expects that prices for switched services will likely decrease by 1% to 1.5% per year, while special access rates would probably remain stable or would increase by only 1%.

Gumper said that isn't because of any migration strategy, although the carrier would like to see greater usage of its switched network because it lowers overall network costs. But, he added, "Nynex is not opposed to having people on private-line service."

The RBHCs also contend that the price cap plan would benefit consumers by giving the carriers incentives to upgrade their networks and introduce new services.

"The plan really provides incentives for companies to operate their internal business more efficiently and be more responsive to customer needs," Gumper said.

Industry Briefs

continued from page 9

"Telmex" would be sold.

Bids from both Mexican and foreign firms will be welcome, Caso Lombardo said. Inquiries have already been made by American, European and Japanese interests, he added.

The Mexican government has increasingly been besieged with complaints from users of the network about bad service.

Fibermux Corp. of Chatsworth, Calif., last week joined forces with **Sumitomo Electric Industries** of Yokohama, Japan, in an agreement to cross-market local network products.

The agreement opens the Japanese market to Fibermux's Magnum line of fiber-optic network equipment.

Sumitomo sells a variety of local network products that Magnum multiplexers can link to a backbone network, according to Fibermux executives.

Touche Ross & Co., one of the nation's largest accounting firms, and **Unisys Corp.** have teamed up to provide large-scale commercial systems integration services.

The strategic alliance combines Touche Ross' expertise in information technology consulting with Unisys' computer and network products, said Bill Atkins, national director of information technology consulting for Touche Ross.

Under the agreement, Touche Ross and Blue Bell, Pa.-based Unisys will help users plan for network projects, develop and implement applications, and assess the management of such networks. The firms will determine which will serve as the prime contractor on systems integration projects on a case-by-case basis. The move reflects the growth of commercial systems integration opportunities.

New York City-based **Booz, Allen & Hamilton, Inc.,** another big accounting and consulting firm, earlier this year announced that it planned to step up its commercial systems integration offerings ("Consulting firm expands systems integration efforts," *NW,* Feb. 6).

Worth Noting

Wayne Myers, corporate accounts director for Cable & Wireless Communications, Inc., said his company can provision fractional T-1 service in three to five days. By comparison, AT&T quotes 11 days and US Sprint Communications Co. quotes 60 days to install the service.

Carrier Watch

Quality Inns, Inc. recently awarded **AT&T** two contracts, worth an estimated $45 million, for System 75 private branch exchanges and Megacom services for its new Sleep-Inn hotel chain.

The company awarded AT&T a $33 million contract for Megacom service, which will be used by its corporate staff to communicate with hotels, and Megacom 800 service, which will be used by guests to reserve rooms at the hotels.

Under the second contract, valued at $12 million, AT&T will install wiring and a System 75 PBX at each new Sleep-Inn hotel.

AT&T said the contract is its first major victory in the hotel/hospitality PBX market, a niche market that is dominated by companies such as Mitel Corp.

Before winning the Quality PBX contract, AT&T hadn't cracked the PBX portion of the lodging market in a significant way, according to William Poe, AT&T national account manager.

"We had made numerous sales [in the hospitality industry] but none where we gained an exclusive. In this sale, every time a Sleep-Inn goes up, it will have a System 75 in it," Poe said.

Quality Inns said it plans to open 300 Sleep-Inns across the country over the next three years.

Feds expect smooth FTS 2000 cutover

Network managers at government agencies say that end users will not be inconvenienced.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — With inital cutovers to the Federal Telecommunications System (FTS) 2000 network only two weeks away, government network managers say users should see little change as a result of the transition.

Cutover preparations at some agencies have entailed taking inventory of all network interface equipment to check access capabilities. In addition, virtually all agencies have sent personnel to carrier and General Services Administration training sessions to learn about FTS 2000.

In total, the switched voice traffic of more than 1.3 million end users at 1,300 federal sites will be migrated to the network over the next nine months. Cutovers have been divided into 18 phases that will involve multiple federal agencies located in government buildings across the country.

Phase 1 locations will be cut over during the weekend of Oct. 6. Phase 2 is scheduled for Nov. 10, followed by Phase 3 on Dec. 1. After that, the network will be cut over every other weekend until all phases are completed in June 1990. Agencies with locations across the country will be involved in numerous phases.

Earlier this month, test runs began for the Phase 1 cutovers. With most of the work behind them now, agency telecommunications managers are expecting a smooth and virtually seamless transition.

> Virtually all agencies have sent personnel to carrier and GSA training sessions.
>
> ▲▲▲

The Department of Justice, which has more than 1,200 locations, has been assigned to the portion of the FTS 2000 network that will be operated by US Sprint

(continued on page 18)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T points finger at MCI. MCI Communications Corp. last week denied AT&T allegations that it has been illegally offering off-tariff rates and conditions to win large user contracts.

In the first formal complaint it has ever filed against a rival carrier, AT&T claimed MCI won the business of Merrill Lynch & Co., Inc., Westin Hotel Co., United Air Lines, Inc., the Department of Defense, the University of Colorado at Boulder and Unigard Security Insurance Co. by offering special deals with terms and rates not outlined in its tariffs.

According to AT&T, this violates provisions of the Communications Act of 1934 that require the filing of tariffs and prohibit discrimination among users for the same service.

MCI admitted that each of the six customers was receiving service under a contract rather than a tariff, but said the companies purchased "nonstandard service offerings." MCI said that, under Federal Communications Commission rules, it has the option not to file tariffs, although it routinely does so for "standard" service offerings.

MCI maintains that the nondominant carriers were given permission to offer services through contract, rather than tariff, in the FCC's 1983 Competitive Carrier proceeding. AT&T never challenged that decision, according to MCI, but is now acting either to reregulate nondominant carriers or deregulate itself.

Tom Norris, vice-president of federal regulatory affairs at AT&T, said AT&T is not questioning MCI's compliance with the Competitive Carrier rules allowing nondominant carriers to

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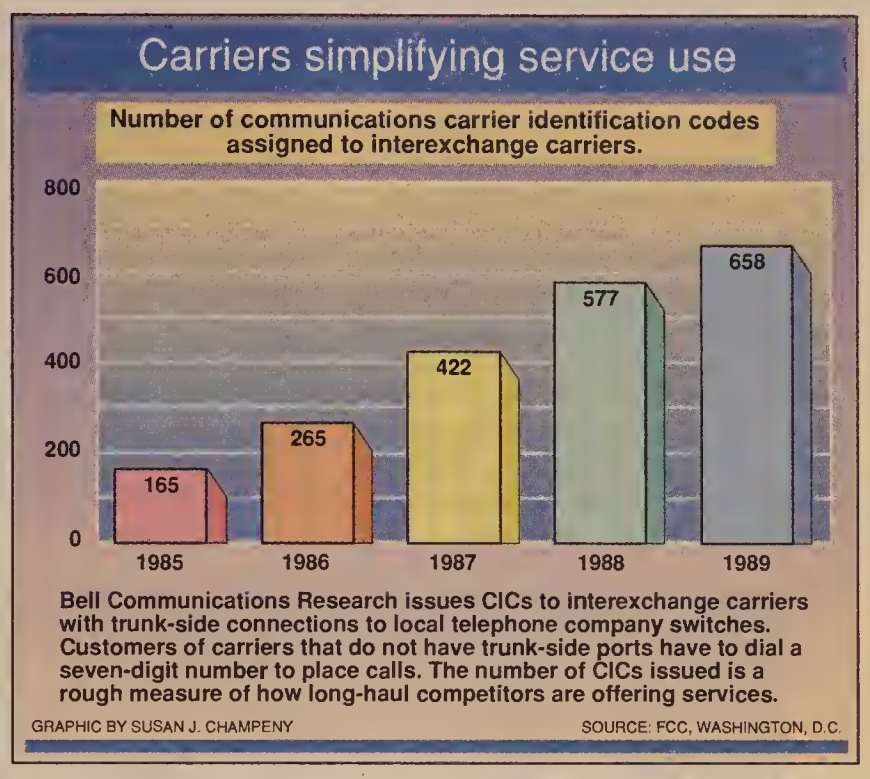

Bell Communications Research issues CICs to interexchange carriers with trunk-side connections to local telephone company switches. Customers of carriers that do not have trunk-side ports have to dial a seven-digit number to place calls. The number of CICs issued is a rough measure of how long-haul competitors are offering services.

GRAPHIC BY SUSAN J. CHAMPENY — SOURCE: FCC, WASHINGTON, D.C.

Davox unveils autodialing device for telemarketers

'Power dialer' supports 192 interface cards.

By Tom Smith
New Products Editor

BILLERICA, Mass. — Davox Corp. recently rolled out an autodialing device designed to increase the call-handling capacity of telemarketing operations.

Unlike Davox's earlier autodial products, the sole function of the Computerized Autodial System (CAS) 1500 is to dial phone numbers, route answered calls to available agents and keep statistics on calls that are not completed.

Davox's existing autodial offerings — turnkey systems that have data-handling functions such as data base updating — supported a maximum of 64 lines and 32 agent positions, according to the company.

Davox describes the CAS 1500 as a power dialer because it supports as many as 192 line interface cards and 96 agent interface cards.

The system provides on-line supervisory control through a terminal designated as the system console.

Supervisory functions include the ability to adapt line/agent ratios to accommodate a change in the number of telemarketing campaigns, as well as the ability to change the number of rings required before a call is designated as a no answer.

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University net managers briefed on AT&T service

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Telecommunications managers from almost 100 Michigan colleges and universities will meet this week to hear details about a new virtual private network service offering proposed by AT&T.

Earlier this month, AT&T announced plans to provide a customized virtual private network for Michigan schools that are members of the Michigan Collegiate Telecommunication Association (MCTA) ("AT&T to offer virtual net for Michigan college group," *NW,* Sept. 4). Members who join the network will be able to pool their voice and data traffic to achieve lower rates based on their combined volume.

The network will be called the Michigan Academic and Governmental Network (MAGnet), and the service will be provided under a new tariff AT&T has proposed to the Federal Communications Commission called State Outbound Calling Service (SOCS). SOCS would provide outbound interstate and international service for state-supported colleges and universities, as well as state and local governments in Michigan.

Rates for the offering will be kept stable for the first three years commencing Oct. 23, the scheduled effective date of the tariff, AT&T said. Schools signing on will be able to discontinue service with 30 days' notice.

Prices for the service are

(continued on page 19)

Feds expect smooth FTS 2000 cutover

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Communications Co. According to Stephen Colgate, deputy assistant attorney general at the Department of Justice, the voice cutover will be fairly smooth for end users.

Colgate said most of the 75,000 Justice Department personnel use GSA-managed Centrex services, so they were not involved with any transition work. Other than some orientation on a slightly different dialing scheme and new calling card numbers, very minimal end-user preparation was required.

William Cunnane, assistant commissioner for the GSA's office of network services, said GSA personnel at Centrex sites worked with their local vendors to prepare network switches for the transition.

A manager at a federal agency with more than 2,000 locations said that while most end users in his agency will see little change in how they will use the network, "to the communications manager, [transition to FTS 2000] is a radical change."

Network managers have had to do inventory on existing private branch exchanges and other switches, he said, and reengineer access while maintaining access to the old system. "Many switchboards do not have that capacity," he said.

Cunnane explained that his agency had to purchase some new digital line cards and T-1 multiplexers to accommodate the new network. Although he could not estimate the cost of the new equipment, he said "we consider it a modernization of our current facilities. We would have had to do it sometime."

Steve Broadbent, deputy assistant secretary for information systems at the Department of the Treasury — an agency on the US Sprint network — said US Sprint took care of most of the Treasury Department's inventory requirements. The Internal Revenue Service will handle oversight of the cutover for the Department of the Treasury, Broadbent said, because it has the largest telecommunications staff within the department.

The IRS will prepare sites for cutover by working with local carriers, PBX providers and the US Sprint team, he said. They will also check to make sure cutovers occur as scheduled and will conduct follow-up visits to ensure that field offices are getting the support required.

Bob Cann, director of AT&T's FTS 2000 Office of Transition Management and Implementation, said, "Our goal is [to make] the cutover a nonevent. All the work [will be] done in advance. How [users] operate and interface with the new network will be no different for plain vanilla switched voice service," Cann said.

US Sprint estimates that, since the FTS-2000 contract was awarded last December, its 83-person transition team has logged over 255,000 hours in preparation work. That work involved building a data base of network equipment and visiting sites to verify traffic information, determining signaling protocols, identifying customer premises equipment requirements and training agency personnel.

Much of the training that has been conducted has focused on informing users about new features and how to use them. For voice, these capabilities include agency-recorded announcements, conference calls, authorization codes, call forwarding and inward station access — a type of toll-free access.

Carriers have also been training agency personnel on new data and video services. US Sprint said installation of these enhanced services is not dependent on the schedules for cutovers of switched voice service.

> "Our goal is [to make] the cutover a nonevent," says AT&T's Bob Cann.
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According to Colgate, most of the training at the Justice Department has pertained to data transmission. In addition to switching existing AT&T services such as T-1 to the US Sprint network, he said the Department of Justice will add new capabilities such as digital packet-switched service. To prepare for the data transition, he said, "we'll no doubt have to modernize modems and controllers as well as update T-1 multiplexers."

Colgate expects to save at least 40% on voice services and 20% on data services.

FTS 2000 contract battle rages on

WASHINGTON, D.C. — Even as AT&T and US Sprint Communications Co. are readying themselves to bring customers onto the Federal Telecommunications System (FTS) 2000 network, MCI Communications Corp. is continuing to wage a legal battle over the contract.

Earlier this month, MCI filed a protest with the General Services Administration over AT&T's first FTS 2000 customer, the Health Care Financing Administration (HCFA), an arm of the U.S. Department of Health and Human Services. MCI was protesting an HCFA proposal to support an on-line prescription billing system with FTS 2000 services.

The on-line system will include point-of-sale terminals and personal computers at about 60,000 pharmacies, allowing them to determine when Medicare recipients have reached their deductibles and are no longer required to pay for prescription drugs.

In its protest, MCI claimed that FTS 2000 was intended to be used only to link government users. It argues that, by bringing outside users onto FTS 2000, the GSA and HCFA are illegally expanding the network contract beyond its original intention.

Modification of an existing contract for purposes not originally specified is prohibited by federal procurement law, according to MCI. Besides the possible legal problems, MCI claimed the GSA would also prevent government users from getting the best prices and technology.

"Price reductions in the telecommunications industry are so dynamic that even today, before the FTS 2000 has become operational, FTS 2000 prices are lagging behind competitive pricing," MCI said in its protest.

In April, MCI objected to the use of FTS 2000 to provide data and video services.

Jerry Edgerton, MCI's vice-president of government systems, said the original intent of Congress was to require government agencies to use FTS 2000 for switched voice services only.

— Anita Taff

Davox unveils autodialing device

continued from page 17

The CAS 1500 houses telephone line interface cards, disk drives supporting 20M to 150M bytes of memory and a digital switching matrix.

It offers both synchronous and asynchronous ports for connection to computers used to support a telemarketing operation, such as a Digital Equipment Corp. VAX or an IBM Application System/400.

"Most customers will have a telemarketing system but are dialing manually. This will automate that process to give them the most benefit," said Mike Giltner, director of product marketing.

CAS 1500 receives batch files of names and telephone numbers from the host following a prompt from a supervisory terminal, Giltner said. Autodialing is initiated through the supervisory terminal.

When a call is answered, CAS 1500 routes the call to an available agent and simultaneously sends a packet of data about the call recipient to the host, which then provides any further data on the agent's screen.

The Davox product automatically paces the rate of call placement in response to several variables: agent contact rate, number of lines and agents in operation, number of busy and no answer signals, average call length per agent and status of the hold queue, where called parties are placed if they have been reached and there is no available agent.

Users define the maximum length of time a call recipient can be in the hold queue or can program the system so call recipients are never placed on hold. CAS 1500 can also be programmed to play digital voice messages to call recipients.

The system records all call results in an event log and records busy, no-answer and answering machine calls in background mode so no agent intervention is required on calls that are not completed. The event log can be transmitted to the host computer in batch mode to update call records.

Supervisory tasks are carried out on a real-time basis and are nondisruptive so they can be performed without requiring users to suspend operation.

CAS 1500 also has a remote diagnostic capability that enables Davox service personnel to test a user's equipment by dialing in from a remote site.

Davox offers two options on the CAS 1500 — answering machine detection software and a data manager for customers without an automated telemarketing system.

The answering machine detection software offers three options so the autodialer can hang up, pass the call to an agent or leave a prerecorded voice message.

The data manager is intended for the small percentage of customers that might purchase CAS 1500 but do not already have a telemarketing host computer. It is an Intel Corp. 80286-based processor that adds telemarketing data-handling capabilities to the CAS 1500.

CAS 1500 will be available in the fourth quarter; per-agent prices range from $4,500 to $6,000. The data manager costs $10,000, and the answering machine detection software costs $4,500.

Net managers briefed on AT&T service

continued from page 17

based on three factors: the time of day, mileage and type of access used to reach the virtual network.

For users with switched access, the per-minute rate during the day is 14 cents for a 50-mile call, 16 cents for a 1,000-mile call and 17.5 cents for calls over 4,250 miles.

For users of special access lines, the same three one-minute calls would cost 7.8 cents, 11.7 cents and 13.7 cents, respectively. AT&T will waive installation fees and per-mile charges for customers purchasing T-1 lines to access the network.

Slightly higher prices apply for calls made to the U.S. Virgin Islands and Puerto Rico. International calls are priced at regular tariffed rates, minus a 20% discount for calls placed during business hours and a 5% discount for calls made during nights and weekends.

Savings ahead

Gary Green, president of MCTA and director of physical plant and technical services at North Central Michigan College in Petoskey, said his school will be joining the network if the FCC approves the plan. He predicts his college will save about 56% on its current network transmission costs.

While Green could not estimate how many other MCTA members were likely to join the network, he said the potential statewide savings would be "many millions of dollars."

Roxanna Block, MCTA vice-president and director of telecommunications at the University of Michigan at Ann Arbor, said her school will also join the network. Though she declined to estimate how much the school would save, she said, "It definitely makes sense to change."

Washington Update

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avoid filing tariffs. Instead, it is questioning whether the Communications Act permits dissimilar treatment of carriers.

Giving credit where it's due. AT&T filed a proposal with the Federal Communications Commission last week to expand the credits it offers customers for outages on T-1 circuits. For every outage over one minute and up to one hour, users will receive a 5% credit on their next monthly T-1 bill. Credits for longer outages include: 10% for outages lasting up to two hours, 40% for outages between seven and eight hours, and 90% for outages over nine hours. Credits may not exceed 100% of a customer's monthly charge.

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See The Faxnet Form On Page #79.

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

According to Visa International, Inc.'s 1988 Annual Report, Visa credit card holders used the Visa ATM Network's 31,711 ATMs in 33 countries to obtain 9.6 million cash advances in 1988, more than double those of the year before.

Data Packets

Sync Research, Inc. is expected to announce today that it has bolstered the protocol support of its Network Access Controller (NAC), a multiprotocol X.25 packet assembler/disassembler.

The software enhancements add support for Burroughs Poll Select (BPS), IBM Systems Network Architecture/Synchronous Data Link Control, IBM Binary Synchronous Communications, IBM 2780/3780 Remote Job Entry (RJE) and Sperry/Univac Corp. Universal Terminal System (UTS) to the array of protocols the NAC already supports. Among those are various asynchronous protocols plus NCR Corp. 270/2270 and 796 protocols.

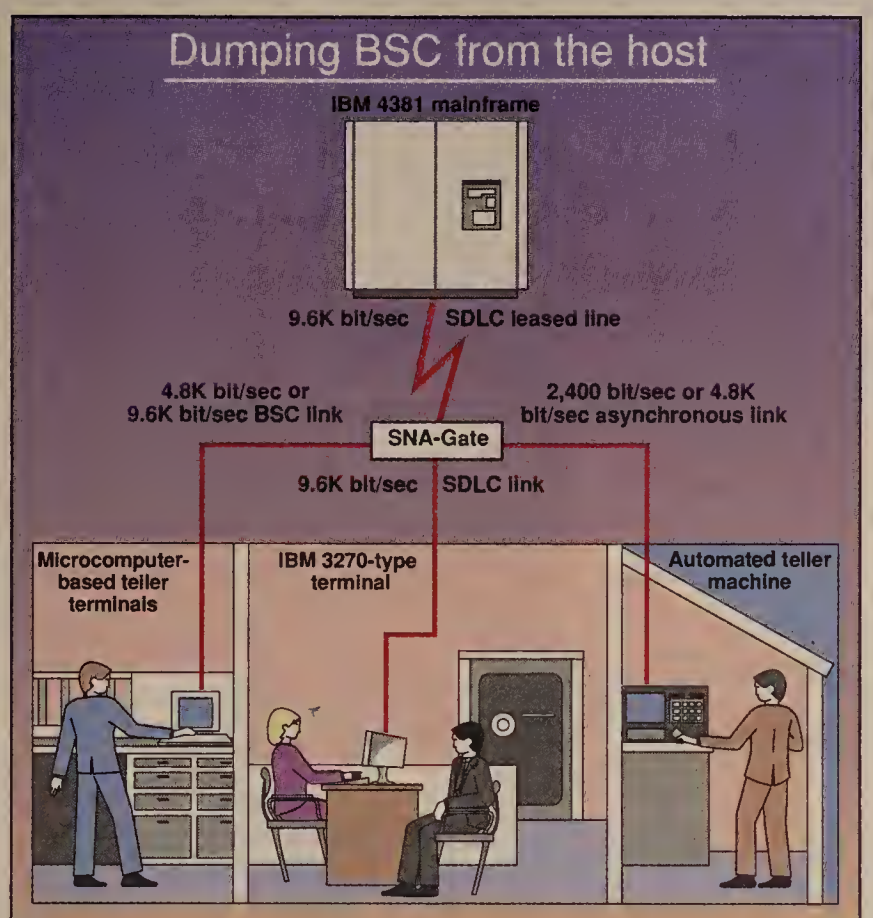
With NAC, users can consolidate different protocols onto one or more X.25 trunks. The product can be used to consolidate separate networks onto a common backbone, regardless of the protocols supported on those networks. This obviates the need for separate PADs and access lines for each network.

Available now, the software products are priced at $500 for SNA/SDLC, BSC or 2780/3780 RJE, and $1,200 for Sperry/Univac UTS or BPS.

For more information, contact Sync Research at 13891 Newport Ave., Tustin, Calif. 92680, or call (714) 669-8020.

Bain & Company, Inc., a Boston management consult-

(continued on page 23)



American Pioneer Savings Bank uses NetLink SNA-Gate to format downstream BSC data into SDLC data streams. The bank will soon use the device to format asynchronous data into SDLC.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: AMERICAN PIONEER SAVINGS BANK, ORLANDO, FLA.

Bank rids net of BSC to fix polling glitch

Frustrated by failing terminals and scarcity of BSC experts, bank swaps protocol for SDLC.

By Jim Brown
Senior Editor

ORLANDO, Fla. — American Pioneer Savings Bank purged IBM's Binary Synchronous Communications protocol from its SNA network after a recent attempt to find programmers capable of fixing a BSC polling problem left them empty-handed.

VTAM software on American Pioneer's host, which supports BSC protocols as well as IBM's more advanced Synchronous Data Link Control, kept disconnecting teller terminals when they failed to respond to three consecutive BSC polls.

> Customers were even writing letters complaining about the inconvenience.
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Compounding the problem, the network was not notifying the data center of the polling failures, forcing net operators to rely on tellers at the 37 branch banks to inform them when their terminals lost touch with the host.

"It was a major source of friction between the data center and the branch locations," said Douglas Sappenfield, senior vice-president and chief administrative officer for American Pioneer, a Savings and Loan Association.

The problem was cropping up in "every branch, every day, every hour," he added. "We were going nuts trying to keep teller terminals up." Employees were frustrated, and customers were even writing letters complaining about the inconvenience.

Sappenfield initially tried to get IBM to fix the problem but discovered IBM no longer had the expertise to help fine-tune BSC nets. He had equally bad luck finding independent software consultants who could provide assistance.

"Contrary to what was happening 15 years ago, there are not that many experts out there who know bisync protocols," he said. "There might be people in different areas of the country who disagree with me, but I couldn't find anybody."

BSC connection

American Pioneer has been using BSC for several years to link microcomputer-based teller terminals in bank branches to its host here. The microcomputers are supported by a local net and tied to the host through a commu-

(continued on page 24)

Air traffic control tangle costs Europe $5b in 1988

Multitude of systems degrades net efficiency.

By Paul Desmond
Senior Writer

FRANKFURT, West Germany — Delays caused by inefficient air traffic control systems in Europe last year cost airlines and travelers $5 billion, according to a recent study by the German Airspace Users Association.

At the root of the problem are 44 control centers that support 22 distinct air control networks. Tracking flights requires an inordinate number of "handoffs," the passing of airplane position data from one center to another. By contrast, the U.S. has only 20 air traffic control centers that collectively cover an area 60% larger than that of Europe.

Air traffic control systems track flights by taking position data, typically supplied by radar, and using a computer to compare that data with flight profiles for planes in the area. Flight profiles contain information about destinations as well as takeoff and arrival times. The computer tracks planes in the vicinity and helps controllers ensure proper separation between the planes.

According to the study, "The Crisis of European Air Traffic Control: Costs and Solutions," it is often necessary to verbally pass on air traffic data from one country to another because the systems used by the various countries are largely incompatible.

Compounding that problem is the need to maintain 30-mile safety cushions between aircraft because radar coordinates often cannot be passed from one control center to the next, according to Ed Plant, senior systems engineer at Systems Control Technology, Inc., an Arlington, Va.-based consulting firm that participated in the study.

> At the root of the problem are 44 control centers that support 22 distinct air control nets.
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To remedy the problem, the study recommended that Europe switch to a single, integrated air traffic control system with only 12 centers (see graphic, page 23). But it could take 17 years to build such a system, the group concluded, so it proposed an interim solution aimed at "harmonizing" existing systems, possi-

(continued on page 23)

Effort to build national network gains momentum

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Researchers, scientists and industry leaders met with senators here recently to voice support for legislation that would appropriate funds to build a high-speed National Research and Education Network (NREN).

Sen. Albert Gore (D-Tenn.) led the hearing — the third in almost as many months — discussing his bill, which calls for the allocation of $1.75 billion over five years to develop supercomputer products and build a national net.

Designed to operate at gigabit speeds, the network would allow researchers at university, corporate and government laboratories to share data and collaborate electronically ("Supercomputer network bill introduced in Senate," *NW,* June 26).

Gore's bill picked up steam earlier this month after the president's Office of Science and Technology Policy (OSTP) proposed similar legislation. The OSTP's bill recommends putting aside $1.9 billion in federal funds for the same purpose as Gore's bill, $400 million of which would be earmarked specifically for the national network.

While the president has not requested funding for either plan, Gore said the OSTP proposal represents an important sign of the administration's support.

"I'm excited about the prospect of passing legislation this year to move the U.S. forward in the information age," Gore said. While some observers say expectations about passage of the bill this session may be optimistic, the chances of appropriating funds are good.

Ron Stultz, director of federal data services at IDC Washington, Inc., a research and consulting firm, said the perceived threat to economic competitiveness, com-

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See The Faxnet Form On Page #79.

Air traffic tangle costs Europe $5b

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bly by using Open Systems Interconnection protocols to link incompatible equipment.

An interim measure is imperative; current systems have caused $600 million worth of lost productivity among air traffic controllers in 1988, the report said.

Also, Europeans waited through 330,000 hours of air traffic control-caused departure delays, according to the report. That figure does not include delays that occurred after takeoff.

Each hour of delay increases airline operating costs in areas such as fuel, salaries and maintenance by at least $2,400 per hour, the report said.

In addition, delays force airlines to buy more planes to meet the same demand, costing airlines another $180 million in excess interest charges in 1988, the report found. That brings the total airline delay costs to $970 million.

The cost of 330,000 hours of delays to passengers came out to $540 million, based on an average value of passenger time of $21.50 per hour.

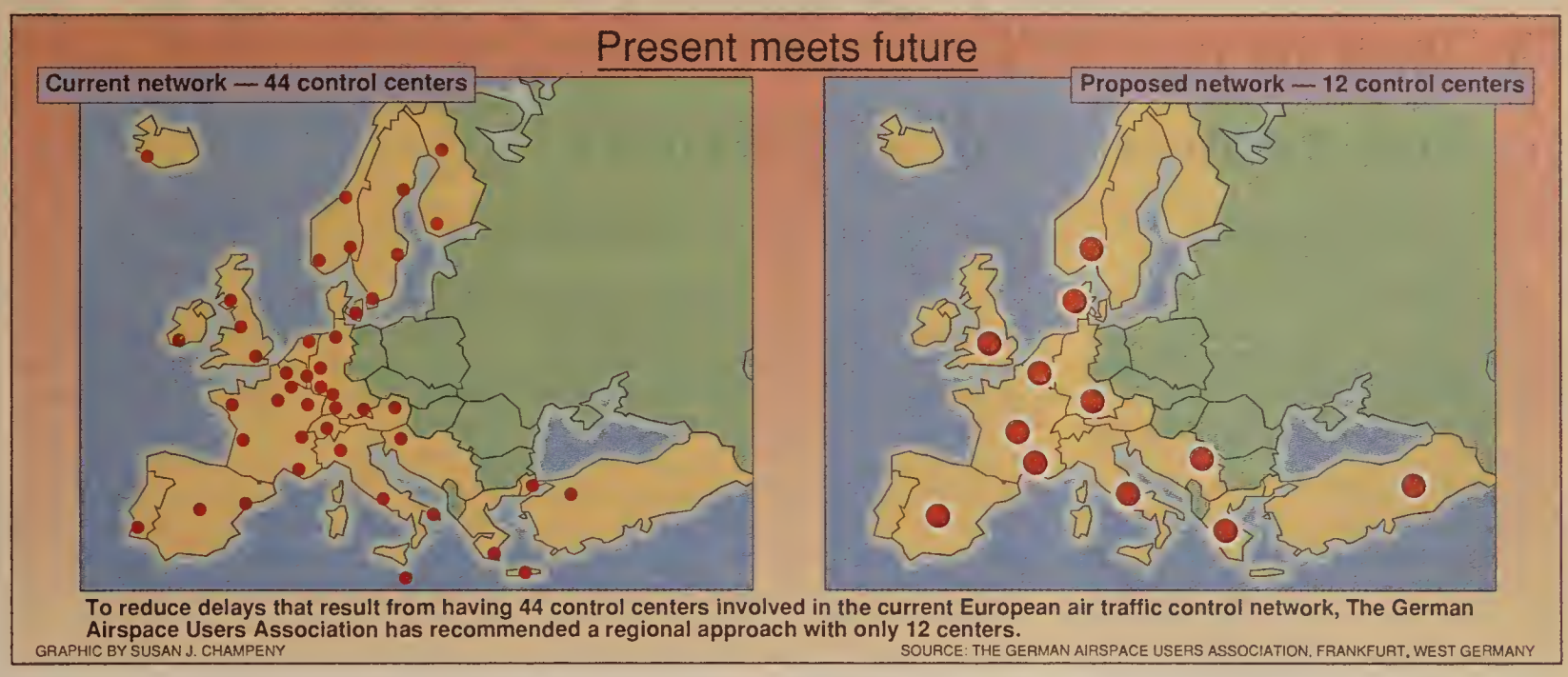
Airlines and passengers also paid an extra $1.78 billion in 1988 because planes flew distances that were 7% longer than was necessary to stay within certain control center boundaries, it said.

Among the other costs blamed on the current air traffic control systems were:

- $650 million to airlines and passengers because the air traffic control systems force planes to fly less fuel-efficient routes upon takeoff and landing.
- $400 million in secondary effects on the European economy as a whole, such as forcing passengers to take trains and cars or to fly at inconvenient times.

The long-term solution to Europe's air traffic control problem is a single, integrated system, the report said. Such a system could be modeled after the U.S. Federal Aviation Administration's air traffic control upgrade effort, which promises to use OSI protocols to communicate between centers. Or it could be modeled after an upgrade based on the advanced systems recently installed in Belgium and Denmark.

Meanwhile, it is imperative that links be established that would allow the various air traffic control systems in Europe to communicate, the report said. The simplest way to accomplish that is by using OSI-based protocols, such as X.400 or File Transfer, Access and Management, to communicate between disparate systems.



To reduce delays that result from having 44 control centers involved in the current European air traffic control network, The German Airspace Users Association has recommended a regional approach with only 12 centers.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: THE GERMAN AIRSPACE USERS ASSOCIATION, FRANKFURT, WEST GERMANY

Data Packets

continued from page 21

ing company, announced last week it has linked its Boston and London offices with a dial-up videoconferencing system.

The system uses **AT&T** Accunet Switched 56 circuits and equipment from **PictureTel Corp.** of Peabody, Mass., to let Bain & Company consultants and clients meet face-to-face without incurring the time and expense of travel.

PictureTel coder/decoders (codec) compress audio and video signals from about 90M bit/sec to 112K bit/sec and routes them over dual switched 56K bit/sec circuits. The codecs are specialized computers that use a proprietary compression algorithm to reduce the video signal for transmission and convert it back at the receiving end.

Du Pont to use MCI E-mail service to link remote trading partners

By Paul Desmond
Senior Writer

WILMINGTON, Del. — E.I. du Pont de Nemours & Co. recently announced it will purchase X.400 electronic mail services from MCI Communications Corp. to facilitate communications with trading partners.

Although no contract has been signed, du Pont said MCI will be its primary E-mail carrier, according to Charles Spriggs, who was du Pont's manager of corporate E-mail when the agreement was developed but has since assumed other duties within the company. Spriggs could not put a dollar value on the agreement.

Du Pont, based here, has some 75,000 E-mail users, and the agreement to use MCI Mail will give each of them the ability to reach du Pont trading partners worldwide.

Communicating with trading partners is "where we see X.400's value right now," he said. "In most cases, it's more effective than some of the alternatives, [such as] telephone and paper mail."

The agreement expands on an existing relationship du Pont has with MCI, Spriggs said. "We've been [using MCI] public mail service for about four years," he said. "This [agreement] will allow us to increase that connectivity."

Although du Pont occasionally places purchase orders via E-mail, Spriggs stressed MCI Mail will not be used as a means to transmit electronic data interchange messages because du Pont has separate links for EDI.

For internal E-mail, du Pont will continue to send messages over its private data network, Spriggs said. That network supports Digital Equipment Corp.'s All-In-1 and VMS Mail, Hewlett-Packard Co.'s HP Desk and IBM's Professional Office System. Besides these E-mail packages, MCI Mail supports links to IBM's DISOSS and messaging systems for Wang Laboratories, Inc.'s local nets, as well as various personal computer-based packages.

Bank rids net of BSC to fix polling glitch

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nications gateway that converts the asynchronous teller terminal data stream to BSC. Applications on the microcomputers are tailored to work with BSC, so the polling problem required Sappenfield to find a way to retain the BSC gateways while isolating the protocols from the SNA network.

To rid the network of BSC and retain existing equipment, Sappenfield installed in each branch a device called SNA-Gate, manufactured by NetLink, Inc. in Raleigh, N.C. The product polls the local net gateway using BSC and then converts the BSC protocols into SDLC format, thus containing BSC at branch offices.

Using SDLC fixed the polling problems on the wide-area link because SDLC prevents VTAM from disconnecting net devices that do not immediately respond to SDLC polls. There have not been any problems with BSC polling within the branches.

In addition to rectifying the BSC polling problem, SNA-Gate offered another inducement: The device accepts native SDLC input, meaning the bank can also use the gateways to support IBM 3174 and 3274 cluster controllers and their 3270-type terminals at branch offices.

SNA-Gates multiplex BSC gateway traffic and controller data onto a 9.6K bit/sec analog leased line, which routes traffic to an IBM 3725 front-end processor attached to the bank's IBM 4381 mainframe.

Using SDLC fixed the polling problems on the wide-area link.

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The BSC gateways were previously linked to the host via leased lines at either 4.8K bit/sec or 9.6K bit/sec, while the controllers were supported with separate dedicated lines operating at 9.6K bit/sec.

Eliminating the need to use separate leased lines reduced American Pioneer's $26,000 total monthly line charges to $14,000 a month, a savings of $12,000 a month, Sappenfield said.

American Pioneer hopes to gain further line savings by attaching asynchronous automated teller machines to SNA-Gate, which will convert the signals to SDLC and multiplex the data stream onto the shared link. To do this, however, the bank has to revise its host software to identify incoming ATM transactions and route them to a third-party ATM transaction processor.

The ATMs are currently linked to the transaction processor via leased lines operating at 2,400 bit/sec or 4.8K bit/sec. Adding the ATMs to SNA-Gate will further reduce line costs by about $2,000 a month.

Sappenfield said all the bank has to do to link the ATMs to the gateway is install an asynchronous board in the SNA-Gate chassis. That chassis can support up to 16 local devices and a single SDLC host link operating at up to 64K bit/sec.

Each SNA-Gate costs between $4,000 and $8,000, depending upon configuration. The current communications cost savings alone covers the price of the NetLink units, Sappenfield said.

SNA-Gate appears to the host as an IBM Physical Unit Type 2.0 device, such as a 3274 cluster controller, and can be configured via a mainframe operator console.

Worth Noting

"A common Remote Procedure Call eliminates arguments over what [application program interfaces] and protocols to write to, and lets the developer concentrate on getting applications to end users a lot faster."

David Fowler
Director of the PC Distributed Business Unit
Sun Microsystems, Inc.
Billerica, Mass.

Netnotes

Atlantic Microsystems, Inc. (AMI) of Salem, N.H., last week introduced ServerBoss, a local network utility that provides system fault tolerance and file backup for 3Com Corp. 3+ local nets.

ServerBoss is a combination hardware and software product that enables users to create mirrored backup files of all file server transactions on 3+ networks. With server mirroring, data on one file server is duplicated by a second standby server, according to Karen Auman, AMI marketing manager.

ServerBoss consists of an IBM Personal Computer AT-compatible adapter board that plugs into 3Com 3S/400 and 3S/500 file servers. Users simply connect two 3Com file servers via AMI's AT adapter and cable. All disk data is then duplicated on the standby server.

When a disk fails, ServerBoss uses the standby disk to retrieve the data. If a server fails, ServerBoss automatically brings the standby server on-line.

ServerBoss for 3+ networks is available now for $8,995. A version of ServerBoss for 3+Open networks will be available in the 1990 first quarter, Auman said.

For more information, contact Atlantic Microsystems, Inc., 84 Industrial Way, Salem, N.H. 03079; (603) 898-2221.

AT&T pack offers access to DOS applications on LAN

Simul-Task expands WorkGroup System reach.

By Laura DiDio
Senior Editor

BASKING RIDGE, N.J. — AT&T recently introduced an addition to its StarGroup software line that enables Unix System V-based 6386 WorkGroup System (WGS) users to access MS-DOS applications simultaneously on other systems across local nets.

The StarGroup Software Simul-Task Client Interface Program is software that runs as an application under Unix System V/386 Release 3.2 and 3.2.1 on any 6386 WGS workstation. Simul-Task Client works in conjunction with AT&T's existing Simul-Task 386 software.

The earlier Simul-Task 386 software allowed AT&T 6386 WGS computers to run up to eight MS-DOS single-user applications concurrently with multiple Unix System V/386 and Xenix applications, according to Scott Perry, AT&T marketing and services vice-president.

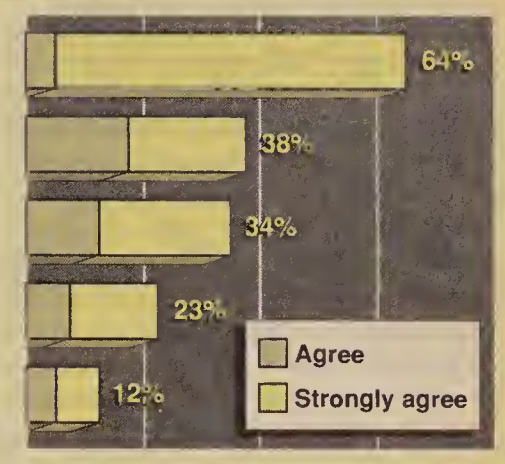
Now Simul-Task Client Interface lets 6386 WGS users access MS-DOS applications across a local network, said Joe McCormick, an engineer at AT&T Bell Laboratories Computer Networking Lab in Middletown, N.J. The Simul-Task Client requests DOS applications residing on other Unix-based workstations or servers on a Starlan network. The DOS applications are stored as Unix files on the net and can be accessed like any other Unix file.

Once it picks up the application, StarGroup Software Simul-Task Client runs the program in 8086 mode, a much slower microprocessor mode than the workstation's own 80386 chip.

"Before this, Simul-Task users were limited to using MS-DOS applications like Lotus 1-2-3 or dBase III Plus on a single workstation. The only way they could share MS-DOS applications with other users on the network was to

(continued on page 32)

User perceptions of OS/2



A nationwide survey of 100 MIS managers revealed that OS/2 is still in the experimental stage. Only 16% of those polled said OS/2 was in use at their company.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

Madge preps switchable speed token-ring adapter

By Susan Breidenbach
West Coast Bureau Chief

SAN JOSE, Calif. — Madge Networks, Inc. is getting ready to roll out its first switchable 16M/4M bit/sec token-ring adapter early next year.

Unveiled at NetWorld '89 in Dallas earlier this month, the Smart 16/4 Industry Standard Architecture (ISA) Ringnode is part of Madge Network's Smart Ring line of intelligent token-ring adapters.

Madge Networks' Smart Ring boards come with 128K bytes of memory to handle network protocol processing, which is offloaded from the host workstation, thereby freeing all but 3K bytes of the workstation's memory from handling net protocols.

Designed for personal computers based on IBM's AT bus architecture, the Smart 16/4 ISA Ringnode is compatible with IBM's switchable 16M/4M bit/sec Token-Ring adapter. At NetWorld, Madge Networks demonstrated the two working together on a token-ring network operating at 16M bit/sec.

IBM announced its 16M/4M bit/sec adapter last November, and other token-ring vendors are racing against one another to be the first to market with a compatible product. Texas Instruments, Inc. is fabricating compatible chipsets for Madge Networks and other third parties, but they are not yet available in production quantities.

Robert Madge, president of Madge Networks, said the half-size Smart 16/4 ISA Ringnode card "is very highly engineered — the smallest it can be." He said he expects the product to beat

Madge Networks' Robert Madge

other non-IBM 16M bit/sec token-ring boards to market, partly because of Madge Networks' in-house protocol expertise.

"We do our own [Logical Link Control] 802.2 development, so we don't have to wait for third parties," Madge said. In addition to being a board manufacturer, Madge Networks is the protocol

(continued on page 32)

Wollongong PC local net products debut

The PathWay packages use TCP/IP to give users access to files on other local or remote systems.

By Laura DiDio
Senior Editor

PALO ALTO, Calif. — The Wollongong Group, Inc. recently introduced a family of products that give personal computer users on local nets access to a variety of computing environments.

The new PathWay product family includes six software packages for Macintosh, MS-DOS, Unix and VMS systems that support standard network protocols such as the Transmission Control Protocol/Internet Protocol, Network Basic I/O System and Server Message Block, said Herbert Martin, Wollongong president.

All of the PathWay products use TCP/IP to provide access to files and peripherals on other local or remote systems.

The seven new PathWay products include:

- PathWay Access for DOS — a software package that runs on any DOS-compatible personal computer and enables it to access files from any Macintosh, Unix, VMS or DOS-based processor supporting TCP/IP. PathWay Access capabilities include Telnet remote log-on, File Transfer Protocol file transfer and IBM 3270 emulation. PathWay Access for DOS costs $395.
- PathWay Server for DOS — server software that lets DOS-based personal computers act as dedicated file servers for networked personal computers running PathWay Access for DOS. It costs $2,295.
- PathWay Client Plus for DOS — software that resides on the personal computer and allows it to function both as a file-sharing client on the network and as a background file server, while simultaneously running DOS applications. The personal computer, for example, can request and store files and peripheral services as though it were just another node on the local net, Martin said. At the same time, it can act as a server and provide file and print services to other client nodes on the network. PathWay Client Plus for DOS sells for $1,095 in an initial five-user configuration; each additional five-user software package costs $950.
- PathWay Server for VMS — server-based software that lets Digital Equipment Corp. VAX minicomputers running VMS act as nondedicated file servers for networked personal computers. PathWay Server for VMS can be installed on the full range of VAXers used as servers, Martin said, from the entry-level VAXStation 2100 through the high-end VAX 6000 Series. PathWay Server for VMS ranges from $2,000 for the VAXStation 2100 to $21,000 for the VAX 6000 Series.
- PathWay Server for Unix Systems — server software that gives Unix System V Release 3 and Berkeley Unix Version 4.3 BSD computers the capability to function as nondedicated file servers for networked personal computers. PathWay Server for Unix Systems ranges from $2,000 to $21,000, depending upon configuration.
- MacPathWay Access — software that resides on Macintosh computers enabling them to connect to any host system via TCP/IP. MacPathWay Access software runs on all Macintosh models and uses the standard

(continued on page 32)

Standard Microsystems unveils smart Arcnet hub, net interfaces

By Susan Breidenbach
West Coast Bureau Chief

HAUPPAUGE, N.Y. — Standard Microsystems Corp. (SMC) made a flurry of new product announcements at NetWorld '89 in Dallas earlier this month, headed by an intelligent Arcnet hub that gives Arcnet local nets a measure of fault detection.

The SMC Intelligent Hub constantly monitors the lines to each network node, using light indicators to alert network administrators to potential problems. If the hub senses excessive line noise or continual reconfigurations, it will automatically disconnect the associated workstation.

The hub samples the disconnected line and node occasionally, and will bring the node back up if the problem goes away.

Geof Karlin, director of marketing for SMC's systems division, called the product the first Arcnet hub to have such built-in network management capabilities. "A network of Intelligent Hubs will eliminate the need to manually disconnect each cable from every hub to isolate network problems," he said.

Karlin added that the SMC Intelligent Hub's price — $659 for the coaxial version and $895 for the twisted-pair unit — represents a significant price/performance breakthrough, positioning the product not against other intelligent hubs, but against nonintelligent products with much more limited capabilities.

A picture of the hub, including status indicators, is displayed on the monitor of the net administrator's workstation. The administrator can interact with this graphic interface to override the hub's automatic connection/disconnection decisions.

Available in November, the SMC Intelligent Hub supports coaxial and twisted-pair media, and is compatible with SMC's existing coaxial, twisted-pair and fiber-optic hubs. The unit has eight ports on the front for connecting to workstations, and a special port on the back for cascading multiple Intelligent Hubs. This cascade port eliminates the need to use one of the node ports on the front when daisy-chaining hubs together.

SMC also used NetWorld to introduce a new fiber-optic adapter and hub, two new net interfaces for laptop computers and a new line of Macintosh Arcnet adapters.

The new half-size fiber-optic Arcnet board for industry-standard personal computers has a rear panel with two diagnostic LEDs that show the activity on the receiving and transmitting fibers.

An accompanying optical hub has four ports on the front and a fifth connection on the rear for linking multiple fiber-optic hubs. It comes in 120-volt and 240-volt models, and can be mixed on a single Arcnet network with SMC's coaxial and twisted-pair hubs.

The fiber-optic adapter is priced at $495, and the optical hub costs $1,295. Both are available now.

SMC is moving into the Macintosh market in November with the release of four products that will let users attach Macintosh computers to Arcnet local nets.

The Macintosh SE is being supported by a two-board combination: an Arcnet controller that plugs into the computer's internal expansion slot and a transceiver that attaches to the system's accessory port. The Macintosh II is accommodated by Arcnet adapters that combine the controller and transceiver in a single NuBus expansion board.

> If the hub senses excessive line noise, it will automatically disconnect the associated workstation.
>
> ▲▲▲

The two-board Macintosh SE adapters are the Arcnet-SE100, which supports coaxial media in a star topology, and the Arcnet-SE250, which supports the use of twisted-pair cable in either a star or daisy-chain configuration. Each product costs $495.

The Arcnet-NB210 NuBus adapter can be used to network the Macintosh II with coaxial media in a star or bus topology, and the Arcnet-NB250 provides a twisted-pair star or daisy-chain option. Either model costs $545.

SMC also introduced an internal Arcnet adapter for Toshiba laptop computers and an external model for any laptop with a parallel port.

The internal boards come in two models: the Arcnet-T100 for coaxial star or bus nets and the Arcnet-T250 for star or daisy-chained twisted-pair networks. Laptop computers equipped from them can be attached to or disconnected from an Arcnet net without disturbing network activity.

The Toshiba adapters are priced at $595 each and are available now.

The external unit, called the LC100, remains permanently attached to the Arcnet network, interfacing between the network and the laptop via the latter's parallel printer port. A printer port on the unit can be used to attach the laptop to a local printer as needed.

Like the internal boards, the LC100 supports both coaxial networks in star or bus topologies, and twisted-pair networks in star or daisy-chain configurations. The unit is priced at $695 and will be available in November.

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Integrated UTP for 4 and 16 Mbps			✓
Mixed-media MAU: UTP, STP and fiber			✓
High availability out-band network management			✓

PC Week, Benchmark Testing, 7/3/89.

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See The Faxnet Form On Page #79.

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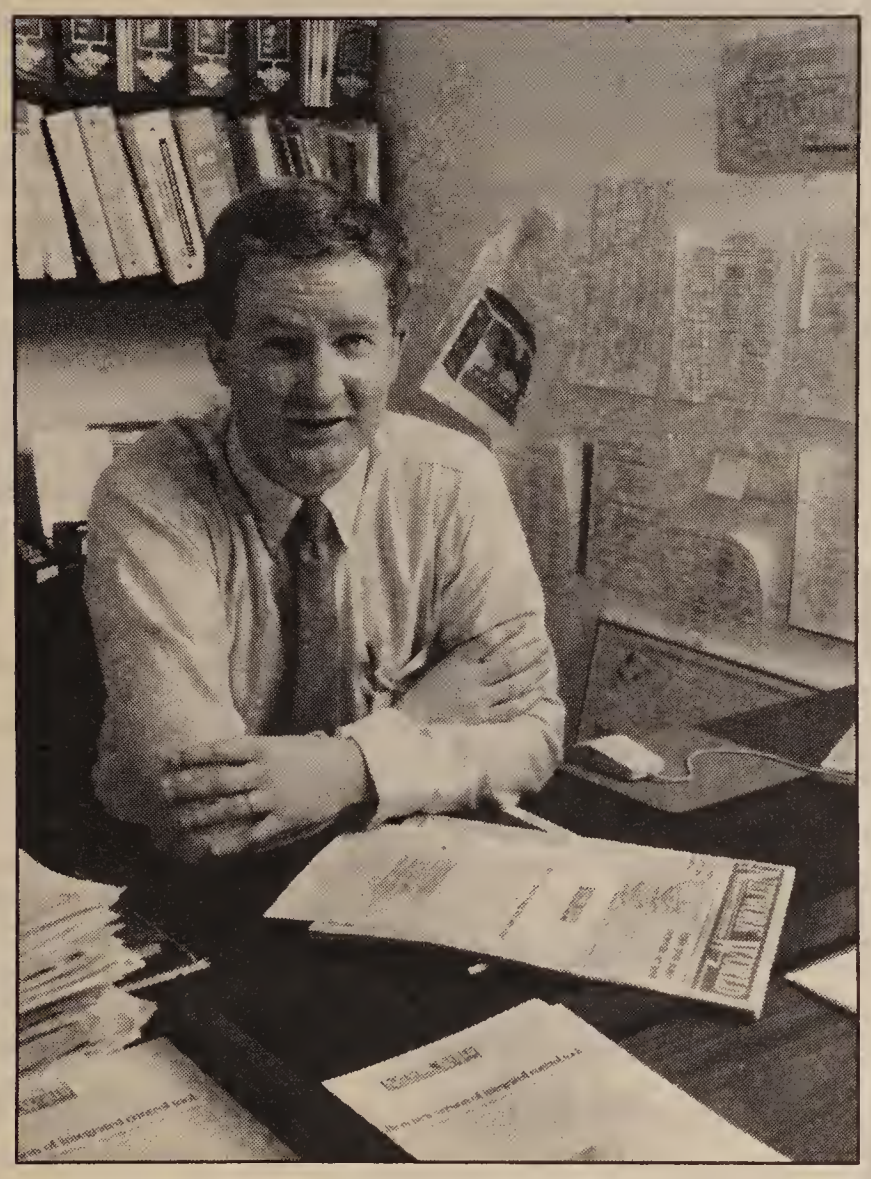
"Editorial coverage in *Network World* gives us valuable exposure in the marketplace."

Chris Carroll
Media Relations Manager
Codex Coporation



Based in Canton, MA, Codex Corporation is a subsidiary of Motorola with 4,000 employees in 50 countries. It's the largest independent supplier of integrated networking equipment and systems. And, according to Chris Carroll, Media Relations Manager, keeping the marketplace up-to-date on the company's broad range of voice and data communications systems is no easy task. Fortunately, Codex gets lots of help from *Network World* editorial.

"Our customers and prospects readily recognize the Network World *logo and have great respect for the publication. They depend on its quality editorial week after week. So when Codex gets covered, we know our products and strategies are getting valuable exposure in the marketplace.*

"That's why editorial reprints are an important part of our public relations program. We primarily use Network World *editorial reprints as leave-behind pieces for our sales representatives and distributors. The reprints are accurate, credible, and quick to obtain. In fact, these four-color reprints give us a current, slick-looking collateral piece for the field in just a few weeks.*

"Take for example, Codex's recent introduction of DualVIEW™, the industry's first modems that can be managed by a Codex network management system as well as IBM's NetView. Network World *presented an excellent analysis, accurately portraying the real significance of this complex product to the marketplace. We knew this coverage could go a long way in augmenting our marketing efforts.*

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NETWORK WORLD
The Newsweekly of User Networking Strategies

An IDG Publication

Madge preps token-ring adapter

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specialist that provided the Network Basic I/O System Extended User Interface transport protocols for Microsoft Corp.'s OS/2 LAN Manager.

The Smart 16/4 ISA Ringnode will operate as either an eight-bit or 16-bit board. It is designed to detect whether it is seated in an eight-bit or 16-bit slot, and adjust itself accordingly.

In 16-bit mode, the board can act as a bus master, taking control of the host computer's central processor to increase network throughput. In eight-bit mode, the board uses the more traditional memory-mapped I/O to optimize performance.

The intelligent adapter with its 128K bytes of memory can download such networking protocols as NETBIOS and Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) from the host workstation, freeing up as much as 50K bytes of DOS memory for applications. This hardware and software design enables users to download new versions of network protocols onto the adapter, eliminating the need to do upgrades by replacing read-only memory firmware.

The Smart 16/4 ISA Ringnode costs $895, which includes Madge Networks' 802.2 LLC and NETBIOS software, net drivers, installation utilities and diagnostic software. The adapter will be available in sample quantities during the first quarter of 1990, with volume shipments scheduled to begin during the second quarter.

AT&T pack offers access to DOS on LAN

continued from page 25

physically exchange floppy disks," McCormick said.

AT&T is targeting the product at three groups of users: network administrators, software developers and end users who are working in both the DOS and Unix environments and currently use separate machines to run both applications, McCormick said.

One beta-test user of Simul-Task Client is Sidley & Austin, a Chicago-based law firm with offices across the U.S. Timothy Harris, the network manager, administers dozens of AT&T Starlan nets — supporting a total of 800 nodes — from Sidley & Harris' Chicago headquarters.

"With just a few keystrokes," Harris said, "I can call up an MS-DOS application and work on another task."

Harris also said he was pleased with Simul-Task Client's Open Look Graphical User interface feature, which lets him run and view up to eight concurrent DOS and Unix sessions in their own separate windows. "I can work in and monitor a single session, or up to eight sessions simultaneously. That saves me a lot of time and headaches," Harris said.

Unlike some other software packages with windowing capabilities, Simul-Task Client ensures that users can't log off their workstations without exiting their various applications, Harris said.

The danger in running multiple simultaneous applications, Harris noted, is that users sometimes forget to store the application and instead just log off; if the information wasn't saved it can end up permanently lost. "But with Simul-Task Client, if I try to log off without exiting and storing any of my sessions, it will tell me which sessions are still active and ask me to either continue or log off. This feature ensures that I don't accidentally lose any work," Harris said.

The StarGroup Software Simul-Task Client Interface Program is available now. Simul-Task Client costs $449 per copy and supports an unlimited number of users on a local net. It requires Simul-Task 386 Release 2.0, which costs $695. Included in the purchase price of all AT&T software is a 90-day toll-free hotline service for customer assistance from 8 a.m. to 5 p.m.

Wollongong PC local net products debut

continued from page 25

Macintosh interface to access TCP/IP services. MacPathWay Access costs from $179 to $495, depending upon configuration.

Wollongong also introduced its first hardware offering, an internetwork router that links Macintosh local nets to backbone networks that use TCP/IP as the internetwork transport protocol.

MacGateWay AT is a router used to connect local networks of Macintosh computers to the TCP/IP backbone network. MacGateWay AT is a stand-alone unit that consists of a Motorola Corp. 10-MHz 68000 microprocessor with 512K bytes of dynamic random-access memory.

The software portion of the device uses the AppleTalk Filing Protocol to route data over thick- or thin-wire Ethernet, fiber-optic or broadband media to the TCP/IP backbone. Exact pricing on the MacGateWay AT has not yet been set, but Martin said it will cost about $2,000.

Mary Modahl, an analyst at Forrester Research, Inc., a market research firm in Cambridge, Mass., hailed the PathWay announcement, saying the products provide users with a consistent method to access files and peripherals in different operating environments.

"The PathWay products address PC LAN users' most basic needs: a file and peripheral sharing system that virtually eliminates the inconsistencies in various operating systems," Modahl said. "With PathWay, for example, a user can incorporate data from a Unix system into a Lotus spreadsheet. And users are increasingly mixing and matching applications."

All PathWay software products are shipping now. Martin said Wollongong will release seven more PathWay software offerings by year end, including client and server products for the OS/2 market.

See the Faxnet Form on Page #79

Worth Noting

"The elimination of trade barriers in 1992 will stimulate the creation of a unified communications environment in Europe, but there is a tremendous amount of work to be done and history to overcome."

John Wishney
Director of business development
Communications Division
Electronic Data Systems Corp.
London

Average network staff sizes

Industry	Average number of personnel in U.S. companies		
	Datacom	Telecom	MIS/DP
Agriculture, mining and construction	4.2	3.7	70.2
Banking and finance	24.8	14.7	188.9
Business and professional services	11.2	5.6	33.5
Education	9.9	14.0	73.9
Government			
Federal	78.7	66.0	77.9
State and local	25.2	18.0	368.8
Health care	13.7	12.7	62.3
Insurance	16.8	9.6	158.9
Manufacturing	11.3	19.9	61.1
Others	10.4	9.0	72.1
Transportation	17.3	33.3	322.4
Utilities	12.9	34.3	136.7
Wholesale and retail	7.9	6.8	88.5
Total sample	16.7	17.6	119.1

Figures are based on a survey of 1,300 users selected from *Network World's* subscriber list and the internal data base of TFS, Inc., a consulting and research firm. A total of 424 usable responses were received.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: TFS, INC., WESTFORD, MASS.

Study: Users don't use EDI to the fullest

Survey of over 700 users reports majority of electronic data interchange nets underutilized.

By Barton Crockett
Senior Editor

NEW YORK — While an increasing number of users are cutting over electronic data interchange networks, the majority of the systems are getting only minimal use.

That's the conclusion of a recently released report titled "EDI User Implementation Strategies," prepared by Frost & Sullivan, Inc., a market research firm based here.

The report is based on a survey conducted last spring of nearly 730 EDI users and more than 300 non-EDI users, located primarily in North America.

In addition to exploring EDI usage, the survey studied reliance on third-party, value-added networks and use of EDI standards.

According to the report, nearly two-thirds of all EDI users use EDI to transmit less than 10% of the business documents their EDI systems are equipped to handle.

Also, the report said EDI users typically employ the technology in only a few divisions — primarily customer service, order processing and purchasing. EDI has been largely ignored in other departments where it could provide benefits, such as in finance, marketing and manufacturing.

"The data suggests that installed EDI systems are underutilized and that EDI is still in the pilot stages for many companies," the report concluded.

The companies surveyed were typically large organizations, with more than 40% of respondents reporting annual revenue in excess of $500 million, according to Patricia Cope, president of the Seattle-based M-R Consulting Company, Inc., which conducted the research on behalf of Frost & Sullivan.

"The data suggests that EDI systems are underutilized," the report concluded. ▲▲▲

According to Cope, companies are getting "stalled out" in implementing EDI for several reasons. One of the most important, she said, is that many companies are finding it time-consuming and difficult to write new EDI applications.

"As with any new software, it

(continued on page 34)

Association Watch

The Network Users Group of AT&T (NUGATT) will hold its fall conference Oct. 23 to 25 in Dallas.

The conference will spotlight case studies of network applications presented by several users.

Network managers from the University of Louisville in Louisville, Ky., will discuss how they interconnected multiple local networks, and managers from the Dallas County Community College will explain how they used T-1 facilities to link local networks at several of that college's geographically dispersed campuses.

In addition, an AT&T executive will speak about the carrier's networking strategy. The first half-day of the conference will be devoted to AT&T product demonstrations.

NUGATT was formed last year by a group of AT&T customers for exchanging information about AT&T data networking products, such as the Information Systems Network, Starlan and Datakit. The independent users group also provides feedback to AT&T about the carrier's data networking product line and strategy.

For more information, contact Stephen Patrick, Bradley University Computing Services, Morgan 205C, Peoria, Ill. 61625, or call (309) 677-2949.

EDS sows seeds of future profit in post-1992 Europe

Company outlines pan-European net initiatives.

By Wayne Eckerson
Staff Writer

LONDON — A top official of Electronic Data Systems Corp. (EDS) last week outlined major initiatives the company is undertaking to capitalize on the expected surge of business activity in post-1992 Europe, when trade barriers among countries are removed.

John Wishney, director of business development at EDS here, said the company is expanding a backbone network connecting its major European data centers. That backbone will be used to provide pan-European network services to multinational corporations eager to cash in on a unified continental marketplace.

"We've been preparing for the past five years," EDS' Wishney said. ▲▲▲

Also, EDS is building a very small aperture terminal network in the U.K. for its corporate customers and will soon link General Motors Corp. and its European suppliers in a massive electronic data interchange network.

"The 1992 trade initiatives have companies interested in networking across Europe, especially for EDI," Wishney said. "We've been preparing for 1992 for the past five years."

New backbone net

EDS provides computer and communications services for customers in 26 countries. The company's worldwide network, called EDS*NET, supports more than 730 million transactions a month for 6,000 customers. Purchased by GM five years ago for $2.5 billion, EDS now oversees the automaker's worldwide computer and communications operations.

In 1984, EDS began building an X.25 packet-switched backbone to connect seven centers in the U.K., France, Belgium, the Netherlands, West Germany and Spain (see graphic, this page). The hubs, which support customer processing applications, are connected via leased lines. The network carries voice, data and image traffic.

EDS' European network is connected to its U.S. network by a 1.5M bit/sec satellite link from London to Detroit. EDS*NET, one of the world's largest, spans 26 countries and handles 12 million long-distance calls a month and just under one billion data transmissions a month.

EDS' largest European customers are GM and Unilever PLC, a London-based packaged foods producer. EDS' network provides these and other customers with

(continued on page 38)

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

Merger phobia. What's the greatest anxiety among corporate executives today? Losing their jobs due to mergers and acquisitions.

That's according to a recent survey of 100 vice-presidents and personnel directors at Fortune 1,000 companies. The survey was commissioned by Robert Half International, Inc., a management recruitment firm based in San Francisco.

More than half of the executives surveyed (54%) said the loss of their job due to a merger or acquisition was their greatest fear. More than twice as many executives said the potential fallout from a merger or acquisition worried them more than anything else. Other anxieties mentioned included: burnout (26%), failure to get a promotion (8%), being fired (6%), failure to get a raise (5%), insufficient income to meet expenses (3%) and illness (2%).

Max Messmer, chairman of Robert Half International, speculated that anxiety about mergers and acquisitions could have a direct bearing on job burnout among executives, the second greatest executive anxiety.

Management that communicates the company's mission and its position in the marketplace and fields employee questions can minimize executive angst, Messmer said.

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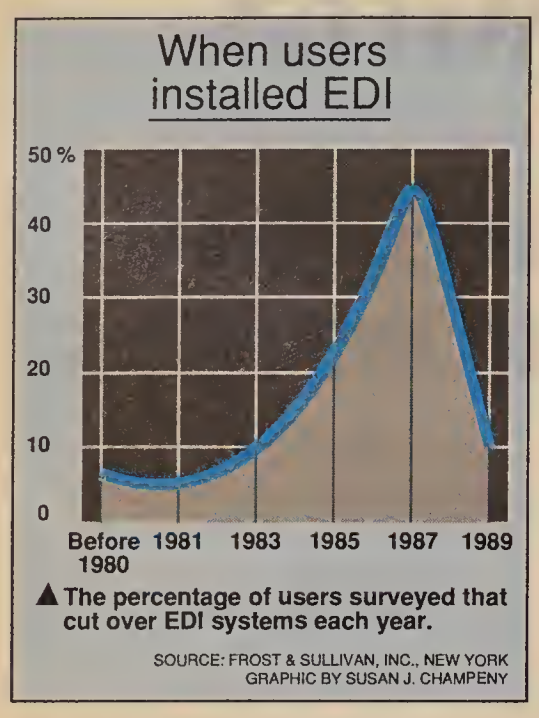


Study: Users don't use EDI to the fullest

continued from page 33

always takes two, three, even four times longer than you thought it would," she said.

Cope said users are struggling to integrate EDI systems with existing business applications so that, for example, invoices received via EDI automatically update an accounts payable system. Until this integration work is completed, users are holding off on aggressively expanding their EDI operations, Cope said.

In addition, many companies are implementing EDI slowly because they view EDI only as a way to cut clerical costs. EDI implementations lag in such organizations because the cost savings available from the technology are seldom large enough to motivate senior management to move quickly.

Cope said companies that view EDI as a strategic tool — one that can increase the timeliness of purchasing data and improve inventory management, for instance — are implementing EDI more aggressively.

She added that concerns about the security of EDI transactions, as well as a lack of stable EDI standards, are keeping some users from expanding their EDI operations.

Skyrocketing use

Despite such concerns, the survey showed the number of users implementing the technology is skyrocketing. It is only very recently that most EDI users even implemented the technology, the report said. Forty-five percent of the EDI users in the survey cut over their EDI networks in 1987 or 1988, exceeding the number of users that implemented networks before then (see graphic, this page). About 10% of the EDI users in the survey implemented EDI in 1989.

Future plans

In addition, nearly two-thirds (63%) of all non-EDI users surveyed said they plan to implement EDI within the next three years.

Other survey findings include:

- Sixty-nine percent of EDI users use ANSI X12 EDI standards. Twenty percent use proprietary formats, while 35% use multiple formats, usually a mix of ANSI X12, industry and proprietary standards.
- Nearly 80% of EDI users rely on some kind of value-added network to transmit their EDI messages. Twenty-five percent of these VAN users subscribe to multiple VAN service providers.

More than two-thirds of the VAN users expect to increase their VAN expenditures in 1989. Nearly half of these expect to increase expenditures by 10% to 29%.

- Mainframes are the most popular EDI software platform, with 33% of the users running EDI software on host systems. Microcomputers were used on a stand-alone basis at 24% of the user companies. Twenty-nine percent of the users employed microcomputers as a front-end for mainframes or minicomputers running EDI software.
- Sixty-seven percent of EDI users purchased or leased their EDI software from a vendor.

Executive Briefs

continued from page 33

Bleary-eyed workers. As working hours grow longer, it seems people will be sleeping less.

A new study shows that for every extra hour workers spend on the job, they sleep an average of 10 minutes less at night.

Working women lose even more sleep than working men, according to the study. On average, working women sleep 25 minutes a night less than their male counterparts.

The study, based on research on about 700 people between the ages of 23 and 65, was conducted by two Michigan State University economists, Daniel Hamermesh and Jeff Biddle. Their research is being distributed by the National Bureau of Economic Research, Inc. in Cambridge, Mass.

The economists speculated that working women spend more leisure time on housework than men and compensate by cutting back on sleep. In contrast, nonworking women tend to sleep a bit more than working men, the study showed.

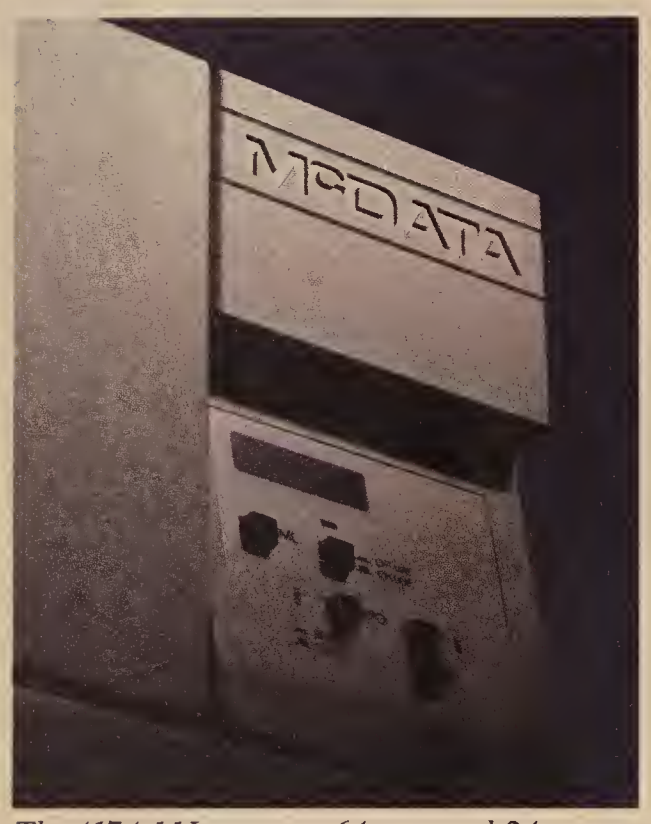
The economists also discovered that an increase in wages reduces the amount of sleep for men. For every 25% increase in wages, men sleep 1% less. In contrast, wage hikes have little effect on the amount of sleep working women get.

According to Biddle, an assistant professor of economics, an increase in wages usually means people will have to work longer hours. Men react to this by cutting back on sleep, whereas women prefer cutting back on leisure time.

"Economists have always considered that sleep was a matter of personality or genetics," Biddle said. "Our study shows that sleep responds to economic incentives."

We've made a name for ourselves in connectivity but you don't know it. Yet...

Though we have an installed base of more than 70,000 connectivity devices in more than 38 countries, a worldwide distribution and service system, and are the second-largest manufacturer of 3174 compatible cluster controllers, McDATA is not a familiar name in the industry. Until now, our controllers and other products have gone by many names, sold under private label to widely known vendors.

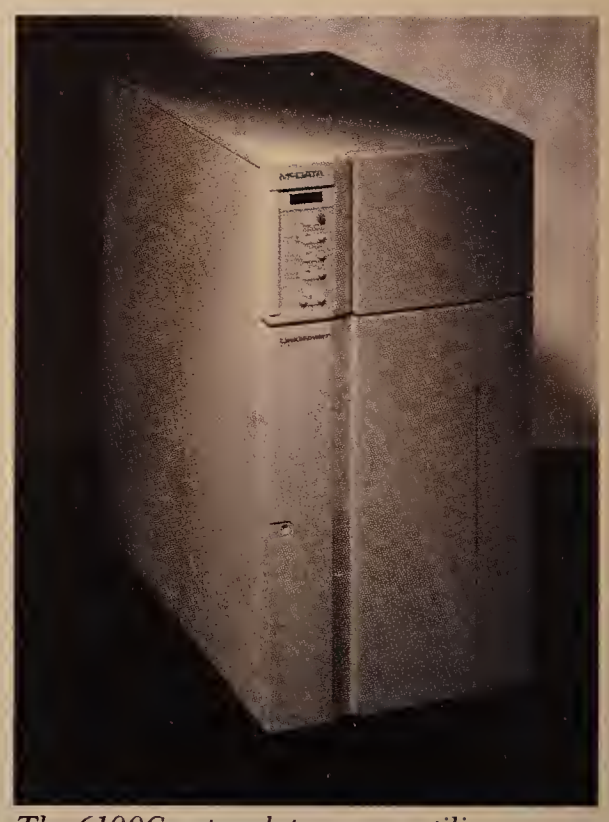


The 4174 11L supports 64 coax and 24 ASCII devices plus a token ring.

Now we are stepping forward. Twenty new LinkMaster® products, sold under our own name, will change the way the information networking industry thinks and acts about connectivity.

McDATA raises network communications to a new plane of efficiency, going beyond plug-compatibility to a sophistication in connectivity which represents a value in itself, not just a workaday necessity.

For example, for bulk file transfers between hosts, the LinkMaster 6100C network processor allows files on a host to be sent quickly and effectively to not just one, but multiple hosts in multiple locations.


The 6100C network processor utilizes existing channel connections for direct NetView interface.

Using the LinkMaster 5000 series of channel extenders, disaster recovery backup tapes can be made offsite whenever they are needed, eliminating the time and expense of manual tape transportation.

The 5000 series of channel extenders can be installed in less than one hour.

LinkMaster 4174 controllers interconnect 3270 terminals, ASCII terminals and PCs to multiple hosts, either DEC or IBM. And LinkMaster products enhance network management with direct NetView interface.

These are just a few highlight examples of McDATA's LinkMaster network solutions at work.

LinkMaster goes beyond compatibility to the next stage of the network communications evolution, a comprehensive multivendor connectivity which, in high-speed, long-distance channel communications, represents the next significant horizon to be crossed.

The new standard in managing large systems involves faster, more economical, more rational channeling of data across communications barriers which previously could not be spanned. McDATA is establishing that standard.

We span the gaps in network communications. McDATA

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DATA

EDS sows seeds of profit in 1992 Europe

continued from page 33

comprehensive network services throughout Europe.

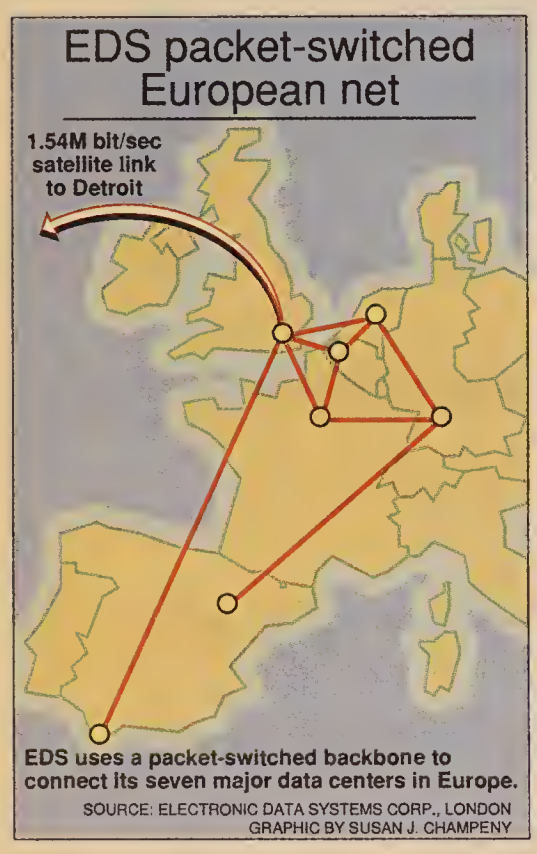
"In Europe, companies would rather have us manage their network than build one themselves," Wishney said. "Companies don't want the hassle of dealing with multiple PTTs and vendors to build a European network. They are looking for a single point of contact that will take care of the headaches for them."

Wishney said EDS will continue to drive the network into other countries and regions as businesses, responding to 1992 trade initiatives, expand their operations throughout Europe.

VSAT net

One way EDS plans to expand its European presence is by building a VSAT network. Besides supporting data communications, the network will allow companies to broadcast such things as training videos and electronic messages to far-flung operations at once, helping users cut travel costs, Wishney said.

Last year, the U.K. granted EDS and five other groups licenses to operate VSAT networks in the U.K., marking the first time



that regulators in the U.K. have allowed private companies to provide VSAT services. EDS plans to install between 300 and 500 VSAT terminals by the beginning of next year.

Wishney said EDS was granted the license because of its extensive VSAT experience in the U.S.; EDS operates 280,000 data terminals and 5,000 earth stations.

Currently, the licenses limit the six groups from using the VSATS to transmit data outside of the U.K. However, Wishney said it's only a matter of time before U.K. authorities relax that constraint as the country moves toward a deregulated telecommunications environment.

Wishney said other countries will soon allow third party-network providers to operate more freely within their borders. Currently, the PTTs in all European countries except the U.K. have a monopoly on VSAT services, among other things. But 1992 and European Commission directives are forcing countries to allow greater competition for network services, Wishney said.

EDI in Europe

In an effort to get a jump on the competiiton for network services, EDS approached GM last September with a proposal to provide EDI links to the automaker's 2,000 European suppliers. GM, which has direct links to only a few of its suppliers outside the U.S., accepted the plan.

To build this extensive EDI net, EDS has negotiated to provide links from its network to several otheer8third-party networks, including those from GE Information Services and British Telecommunications PLC, as well as France's Transpac, Wishney said. Many of GM's suppliers were already linked to one of these network providers.

This EDI networking effort could double the number of EDI users in Europe if all of GM's 2,000 suppliers ccovert to EDI, Wishney said. Currently, there are 1,800 companies using EDI in Europe, he said. EDS plans to finish the network a year from now.

"We are trying to stay a step ahead of what businesses in Europe will be demanding for communications services," Wishney said.

> "Companies would rather have us manage their net."
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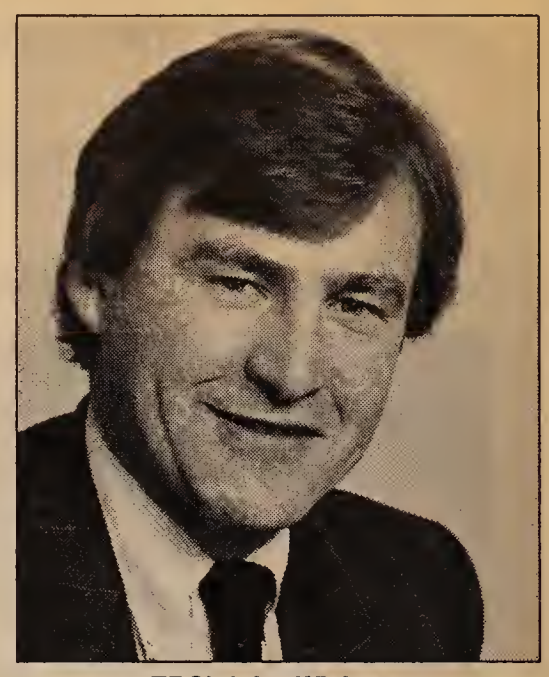

EDS' John Wishney

Small banks face big obstacle in the electronic payments market

Variety of standards puts some institutions at disadvantage.

By Wayne Eckerson
Staff Writer

Dealing with the bewildering array of electronic data interchange formats for electronic payments may keep smaller banks from competing in the emerging electronic payments market.

Smaller banks usually cannot justify the expense of developing or purchasing the software and systems needed to process high volumes of EDI payment transactions in a variety of formats.

That puts them at a distinct disadvantage compared to the many large banks that have already developed translation systems for reformatting a customer's payment information and transmitting it to a multitude of receiving banks in appropriate formats.

The big time

"[Electronic payments] is a game for bigger banks," said Joe Hollis, vice-president of service management technology at Continental Bank in Chicago.

Many users are turning to electronic payment systems because they eliminate costly and time-consuming paper-based payment systems.

A company can pay thousands of bills by sending a single EDI message to its bank, which electronically transfers funds to suppliers' accounts at other banks ("Banks fight for the lead in electronic payments race," *NW,* Sept. 18).

These EDI payments involve transmission of data about the transactions as well as funds.

Hollis said banks must implement expensive mainframe-based systems if they want to compete successfully in the electronic payments field. But small banks won't be able to attract a volume of transactions large enough to justify such expenditures or don't have the resources to begin with, he said.

Banks that currently use personal computer-based payment services will have to upgrade to a minicomputer or mainframe to handle any growth in transaction volumes, Hollis said.

Multiplicity of standards

While no universal standard exists for electronic corporate payments, most industry observers said they believe the best candidate is ANSI 820 transaction set. The standard was developed four years ago by an ANSI X12 subcommittee. ANSI X12 supervises the development of all domestic EDI standards.

ANSI 820 enables a company to exchange payment orders and remittance advice directly with trading partners through their respective banks. ANSI 820 can carry an unlimited number of addenda records of variable length. Those records allow users to document payments for large bills.

In addition to ANSI 820, the National Automated Clearinghouse Association has developed a series of payment formats that banks use when transmitting payments across the association's Automated Clearinghouse network.

CTX standard

The Corporate Trade Exchange (CTX) standard was developed last year to be compatible with ANSI 820 transaction set. CTX acts as an envelope for 820 transaction sets, allowing banks to transmit 820 payment and remittance information across the ACH network. CTX can support as many as 5,000 94-character addenda of remittance information.

"CTX is essentially an endorsement of ANSI 820," said Stuart Levine, EDI product specialist with The Chase Manhattan Bank, N.A. in New York. About 20 banks can receive CTX payments today, but that number is expected to grow significantly, he said.

The Corporate Trade Payment (CTP) standard lets an organization attach nearly 5,000 94-character addenda records — or 5,000 invoices — to an electronic payment transmission. But unlike CTX, CTP is not compatible with ANSI 820 and, as a result, is fading in popularity.

The Cash Concentration and Disbursement with Special Addenda (CCD+) standard allows users to attach a single 94-character addendum — equal to roughly one remittance — to an electronic payment transmission. Often companies put invoice numbers for payments in the addendum and send complete paper or electronic invoices for each payment through the U.S. mail or a value-added network respectively. The U.S. Treasury plans to send 77 million payments per year using CCD+.

The regular CCD standard doesn't have an addendum to carry remittance information. It is generally used for intracompany cash transfers for which remittance information is not needed. Retail and food chains that need to transfer money from far-flung stores to a central account often use this standard.

Bank Administration Institute (BAI) standards are used to transmit lockbox payment information electronically to a company's accounts receivable system. While most lockbox payments are still made with checks, some companies want banks to consolidate all their accounts receivable — including checks and electronic corporate trade payments — and transmit the information to them in BAI format.

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At first, most networks are fast and efficient. But as more people crowd aboard, they push their networks beyond capacity. Eventually, bottlenecks develop that make getting down to work a tough commute.

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It relieves congestion by building smooth connections between dissimilar networks. It easily exchanges data across different protocols and media, including Ethernet, TCP/IP, and HYPERchannel. And HYPERchannel-DX leaves the door open for evolving standards such as FDDI and OSI. So your network grows according to your needs instead of screeching to a halt.

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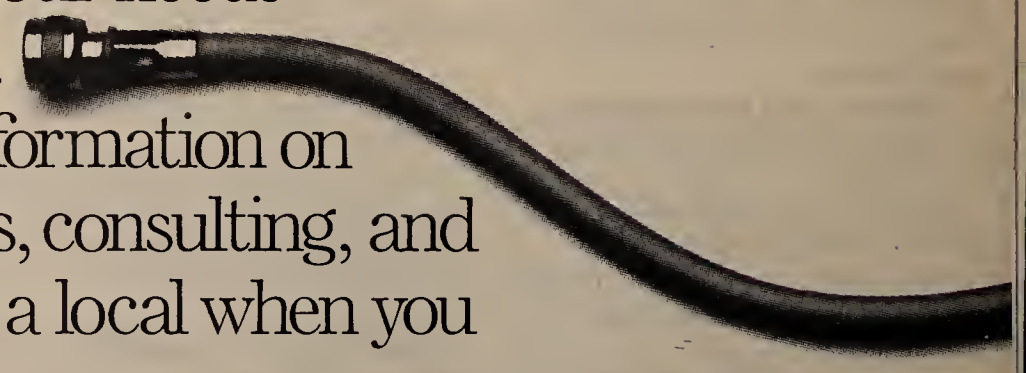

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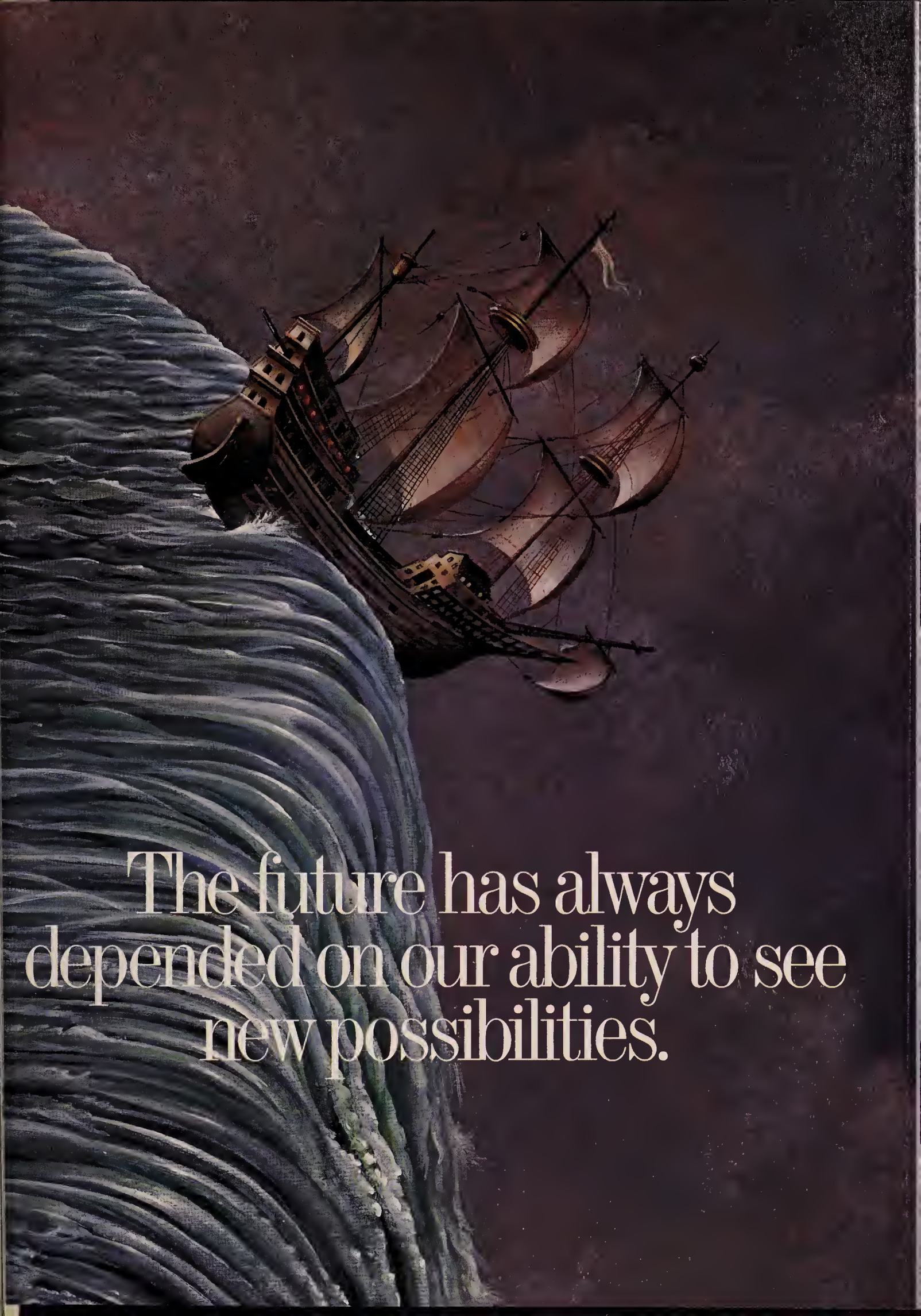
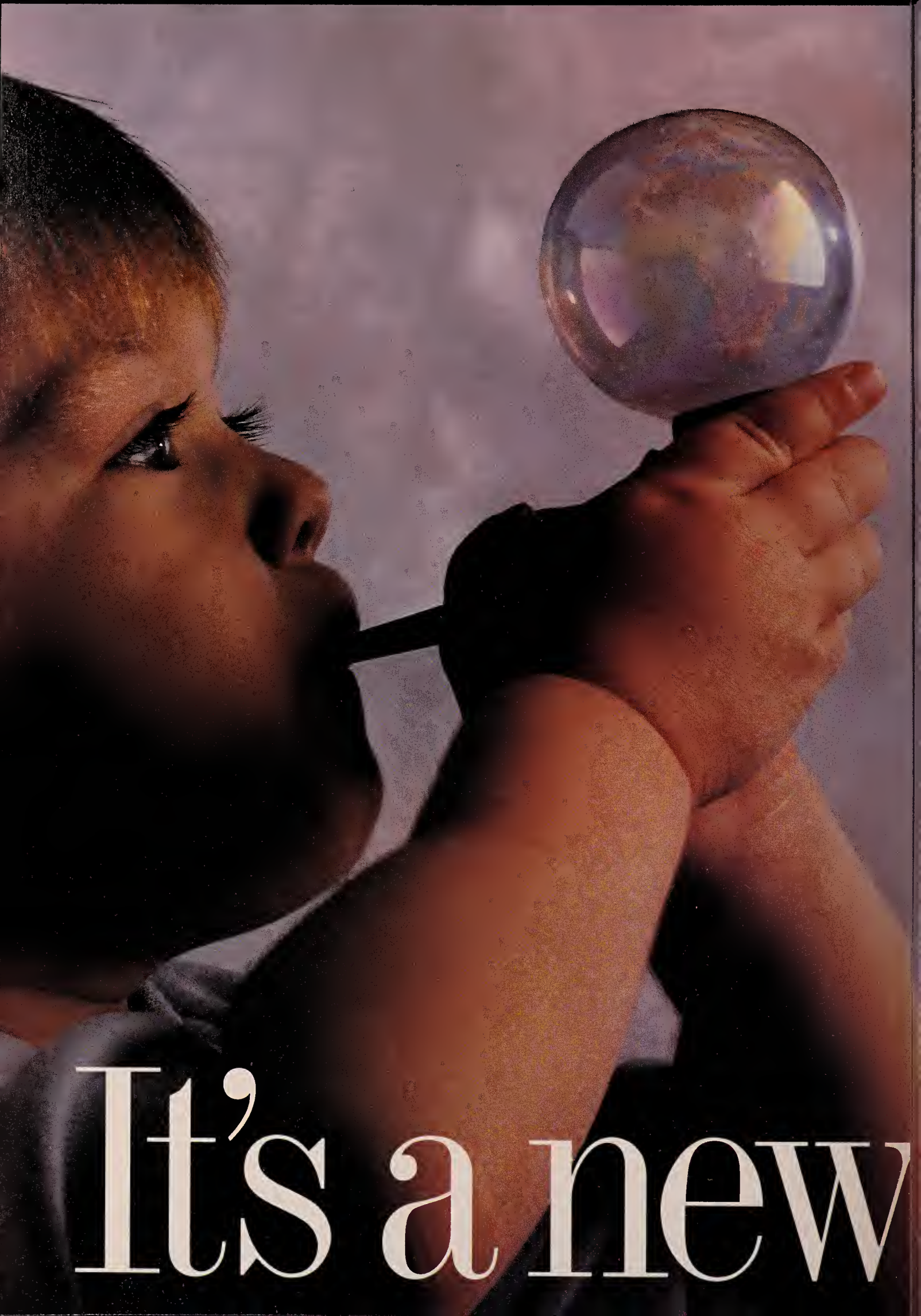
See The Faxnet Form On Page #79.


The future has always
depended on our ability to see
new possibilities.


It's a new

FAX

Another thing perfectly clear.

The wonders of Sprint go beyond clear phone calls. Our 100% digital fiber optic network is also the leading provider of advanced fax transmission technology. A system capable of sending the world's sharpest faxes in only six seconds.

VIDEOCONFERENCING

Going to great lengths so you won't have to.

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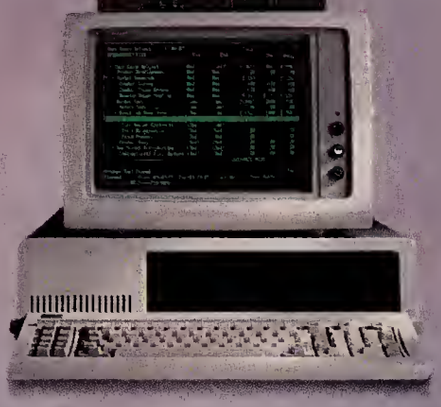
Information instantly. That's the premise behind Sprint's fiber optic data transmission. In the time it takes to open a book, Sprint's everyday network can transmit the entire contents of the Encyclopedia Britannica. With 99.9% reliability. And thanks to our 56 kbps technology, it can all be done with the ease and cost of a phone call.



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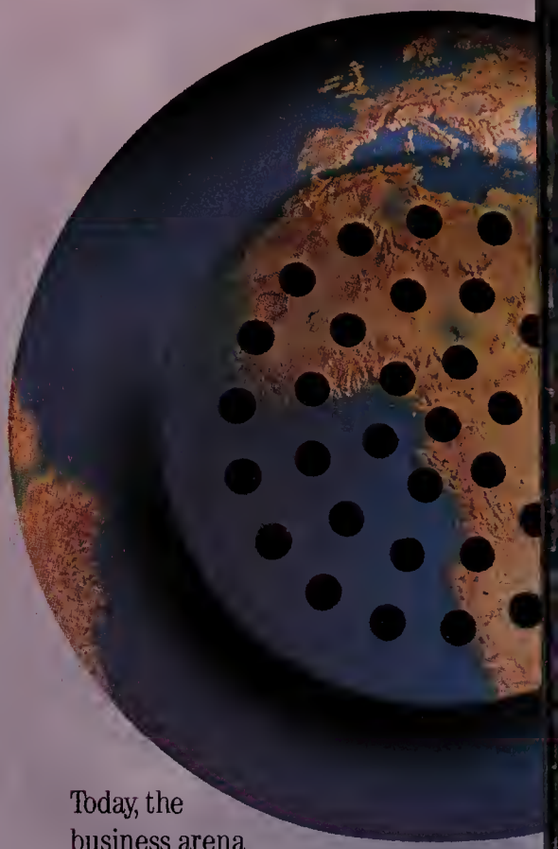

Today, the business arena crosses more and more national boundaries. And fortunately, so does Sprint. Our growing network is now offering fiber optic voice transmission to major commerce centers around the world. Not to mention fax and data capabilities as well as electronic mail and videoconferencing. All of which are particularly important in today's ever changing "global village." After all, the world isn't just getting smaller. It's getting smarter.

US Sprint®

There was a time when people were content to stay within the boundaries of conventional "wisdom." The prevailing perception was that the existing standard of technology should not, and would not, be challenged. Such was the state of telecommunications.

We at US Sprint® have a different vision. Perhaps that is why we were the first to chart the way to a new world of technology: the only 100% nationwide digital fiber optic network. It represents, quite simply, the best known replication of signals for voice and data communications.

But just as importantly, our network also possesses seemingly unlimited potential to adapt to all future advances in telecommunications. You see, at US Sprint our eyes tend to wander out toward the next horizon. But then that's how we got to where we are today.

Not just a world apart... but a world ahead.

world.℠

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- Microtronix Datacom's new PAD that acts as a front-end processor for a DEC VAX
- Two latest versions of the Priam Network Drive System

First Look

RG Software unveils virus diagnostic pack

RG Software Systems, Inc. recently released a virus diagnostic utility, called **Vi-Spy,** that scans network servers, hard drives and floppy disks for 22 known viruses.

If a virus is found, Vi-Spy identifies the virus by name and points to the infected file. The utility eliminates the virus by writing over the entire file with zeros before erasing it. This ensures that the virus cannot be resurrected with an "unerase" program.

Among the viruses that Vi-Spy can find and destroy are the Datacrime virus (rumored to have a trigger date of Oct. 13), a different virus that erases files on any Friday the 13th and the Fu Manchu virus, which is expected to strike in December.

RG Software Systems claims that Vi-Spy's 22-virus hit list is a complete catalog of all known viruses. The utility runs on IBM Personal Computers and compatibles under DOS 2.0 or greater. It is available on both 3½-in. and 5¼-in. floppies.

Vi-Spy is priced at $250 for use on any number of computers at one site. A subscription service is available for $150 per year for troubleshooting support and updates on newly identified viruses.

RG Software Systems, Inc., 2300 Computer Ave., Suite E-28, Willow Grove, Pa. 19090; (215) 659-5300.

Hughes LAN Systems PC adapter card out

Hughes LAN Systems, Inc. (HLS) recently unveiled a *(continued on page 44)*

Hitachi arm set to unveil low-end PBX

By Tom Smith
New Products Editor

ATLANTA — The Telecommunications Division of Hitachi America, Ltd. is scheduled to unveil today a 416-line private branch exchange to complement the larger switches in its HCX5000 line.

The HCX5300 fits in below the HCX5400, which accommodates up to 1,500 lines, and the HCX5500, which supports up to 3,000 lines..

Hitachi also announced an attendant console for the high-end HCX5000s and a remote-switch module that can be used to extend Integrated Services Digital Network capabilities to remote buildings via fiber-optic links.

The HCX5300 has 34 universal card slots, which accommodate 16-line analog or digital interface cards. The company is targeting the product at users requiring between 50 and 350 lines.

ISDN support

Like the larger HCX5000 models, the HCX5300 supports the company's implementation of the ISDN Basic Rate Interface for communications with its SelecSet telephones equipped with a data adapter. The card is not, however, compatible with AT&T's Basic Rate Interface specification.

Hitachi's Primary Rate Interface card, by contrast, is compatible with AT&T's implementation of the Primary Rate Interface and supports AT&T's Call-By-Call Service Selection and INformation FOrwarding-2 service options, according to Michael Medin, director of systems engineering. Built-in functions of the PBX include an automatic call distributor (ACD), call accounting and integration with third-party voice-messaging functions, Medin said.

(continued on page 42)

VMX introduces low-end voice-processing system

SAN JOSE, Calif. — VMX, Inc. recently unveiled a low-end, small-office-type voice-processing system that can be networked with other VMX systems in larger corporate locations.

The company claims the VMX 100 is the first full-featured voice-processing system for organizations with 100 or fewer employees. VMX estimates that there are more than 200,000 private branch exchange and Centrex users that have less than 200 lines and currently do not use voice-processing equipment.

The VMX 100 supports 25 to 200 users and up to 500 mailboxes. It can be configured to support two ports and 2½ hours of storage on a 40M-byte drive to eight ports and six hours of storage on an 80M-byte drive. Larger VMX processors offer 64 ports and support up to 10,000 users.

The VMX 100 can be integrated with PBXs and Centrex. It supports the same functions as larger VMX systems, including automated attendant, telephone answering, voice mail and audiotex.

Automated attendant

Automated attendant features enable the customer to perform both primary and secondary answering, according to Norm Chambers, product marketing manager. During primary answering, the caller is instructed to key in an extension number or wait for assistance. In secondary answering, the caller can select more options, depending on whether the intended call recipient is available to take the call.

The VMX 100's audiotext capability guides a caller through the automated attendant function and can be used to provide information about the company or service. "This takes care of some of the routine stuff," Chambers said. "It assures that every caller gets a consistent and courteous response and that a receptionist handles important calls from people that need personal attention."

VMX's telephone-answering capability is a final step in the automated attendant process, during which an individual's voice message is played to a caller, Chambers said.

Internal callers

For internal callers who wish to leave a voice message, the system offers a range of voice-mail capabilities. A user calling from elsewhere within the company can create a message at his own phone, revise it and then send it to the receiver by keying in a mailbox number or extension number, Chambers said.

VMX 100 also has a broadcast capability that enables users to send messages to multiple recipients without having to generate each one individually.

Users sending messages to re-

(continued on page 44)

AT&T telemarketing software packs bow

Products feature networking capabilities so that departments can share same marketing data base.

By Tom Smith
New Products Editor

MORRISTOWN, N.J. — AT&T recently introduced two Unix-based telemarketing software products that will serve as the cornerstone of its Integrated Telemarketing Platform (ITP).

The products include the Close Marketing and Sales Productivity System for IBM mainframes and the Brock Activity Manager, which runs on AT&T's 3B Series of minicomputers and 6386 WorkGroup Systems (WGS) microcomputers.

Both products have networking capabilities that enable various departments to access and update data bases used to support telemarketing.

The integration of telemarketing with other marketing and sales functions will improve the coordination of telemarketing campaigns because all departments involved will have access to uniform, updated information, the company said.

The products, called Core Solutions, are stand-alone products that perform key telemarketing functions. Later ITP products will combine functions of those products with several existing ITP products.

Close call

Developed by Adelie Corp., an AT&T subsidiary in Cambridge, Mass., the Close product provides a common data base of customer names and information for various departments: advertising, telemarketing, direct marketing and sales. Giving everyone in the company up-to-date information improves sales and service functions, AT&T said.

> Giving everyone in the company up-to-date information improves sales, AT&T said.
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Close was first offered in 1985 for IBM mainframes and in 1988, it was enhanced to support Ultrix, Digital Equipment Corp.'s Unix implementation.

The Close data base resides in an MVS-based IBM 43XX, 30XX or plug-compatible mainframe that supports CICS and VSAM. The data base transmits and receives updates to regional or branch telemarketing offices, where the majority of changes are generated using IBM Systems Network Architecture protocols.

Branch offices require an AT&T 3B Series minicomputer with Unix System V 3.2.1, as well as AT&T 6386 WGS microcomputers for individual agents. Both AT&T machines require 3270 emulation software to communicate with the mainframe.

> AT&T said the Close software will be useful in integrating three key marketing applications.
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The product is designed for telemarketing firms requiring a large data base of customer names, information and account histories, according to William Feuss, district manager of planning in AT&T Computer Systems' Telemarketing Solutions Organization.

The Close product enables the telemarketing company to maintain comprehensive data about a customer, as well as data that is tailored to the marketing needs of a given office, according to Fuess.

Batch sessions from individual minicomputer data bases in branch offices, where regional telemarketing campaigns are carried out, can be used to update customer information on the central data base.

AT&T said the Close software will be useful in integrating three key marketing applications: lead management, tele-account management and regional marketing.

For example, a user could tap the mainframe data base for a list of customers to include in a mail promotion, Feuss said. Any leads generated by the mailing would be sent to an appropriate regional office; that office would contact the potential customer and, if necessary, send a field sales representative.

The results of the regional marketing effort would be entered into the data base, which

(continued on page 42)

Telemarketing software bows

continued from page 41

would be accessed for periodic follow-up calls to the customer.

"As action occurs, updates can be communicated to the mainframe data base so someone with access to that data base can take a look at the marketing program to see how well it did," Feuss said. "You have tracking at each stage of the sales cycle."

Financial services firms have expressed great interest in the product, Feuss said. The mainframe software package is available now, starting at $100,000.

The Brock software, which was developed by Brock Control Systems, Inc. of Atlanta, will be marketed by Brock and AT&T. The product consists of four modules that work with an Informix Software, Inc. data base: the Sales Activity Manager, Customer Support Activity Manager, Telemarketing Activity Manager and Order Entry Activity Manager. Customers must buy either the Sales Activity Manager or the Customer Support Activity Manager; the Telemarketing Activity Manager and Order Entry Activity Manager are options.

> "You have tracking at each stage of the sales cycle," according to Feuss.
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Although custom versions of the Order Entry option are available now from Brock, they will not be available from AT&T until the first quarter of 1990.

The Sales Activity Manager allows telemarketing agents to update information on customers or sales prospects listed in the data base, according to Sandy Brown, product manager.

After contacting a customer, agents can access form letters to follow up with customers or they can utilize the software to prepare a sales proposal. Any follow-up activity is entered in the customer's file, giving anyone who accesses the customer profile a more detailed account history.

Designed for troubleshooting purposes, the Customer Support Activity Manager contains account service histories and problem/solution scenarios to help agents assist customers, Brown said. Agents would be able to access information about any past problems a customer may have had, as well as any other known scenarios that could have caused the problem.

The Telemarketing Activity Manager automates telemarketing applications by providing call guides, which contain telemarketing scripts. Users can update records automatically using function keys that are programmed with possible customer responses.

Brock is available now. A package for a telemarketing center supporting 20 agents costs approximately $40,000; the Telemarketing Activity Manager costs $500 per agent. The additional cost of the Informix data base is based on the processor and the software version.

Hitachi arm set to unveil PBX

continued from page 41

The ACD function is identical to that offered with other HCX5000 models. In a maximum 416-line configuration, the ACD can support 250 answering positions. Each of eight subgroups, which can support a maximum of 64 lines, can hold 50 calls in queue.

HCX5300's call-accounting software can store up to 100,000 call detail records and allocate charges to departments or individuals.

When integrated with third-party voice mail products, the switch supports message-waiting lamps and one-button return messaging. Messaging through a text message center, which is used to provide text messages on the SelecSet display, is also supported.

HCX5300 is available now. It costs from $450 to $600 per line, depending on configuration.

Along with the HCX5300, Hitachi introduced a switch module that can be located up to four miles away from a central PBX and tied to the hub via fiber-optic cable.

Hitachi's Remote Switched

Port Module (RSPM) has 20 universal card slots and can support as many as 320 ports.

RSPM costs roughly 30% to 40% more than a comparably equipped HCX5300 at a central-site location with the same number of ports because of hardware, cabling and power costs.

Attendant console

Rounding out Hitachi's PBX-related announcements is the SelecSet 500A attendant console, designed for HCX5000 users with heavy communications traffic. The console offers an eight-line by 40-character LCD display, 24 programmable keys, 13 fixed keys and six soft keys, which are dynamically configured.

The console displays information about call status, text messages, date and time. It can also be used to program call forwarding, message waiting and other functions. Up to 12 loop keys, which are used to place incoming calls on hold, are supported.

SelecSet 500A is available now. It costs $6,000, including the interface card required for the PBX.

The Telecommunications Division of Hitachi America, Ltd. can be reached in writing at 2990 Gateway Drive, Norcross, Ga. 30071, or by calling (404) 446-8820.

New Cryptall bridge links E-nets over T-2 facilities

By Tom Smith
New Products Editor

CRANSTON, R.I. — Cryptall Communications Corp. recently unveiled a bridge that can be used to link remote Ethernets over 6.312M bit/sec T-2 digital wide-area facilities.

The 3000 Series T-2 Bridge, which can be used with T-2 channels within a 45M bit/sec T-3 link or with private microwave systems, packages Ethernet traffic in X.25 format to overcome the limitations of throughput.

Extra capacity

When connecting the bridge to the T-2 port of a T-3 multiplexer, users will have capacity left for six more T-2 channels or 24 T-1s, said Jeffrey Weiss, president of Cryptall.

Although the Ethernet transmission speed is 10M bit/sec, its actual throughput is lower because of contention, which makes T-2 speeds sufficient for bridging, Weiss said.

The Series 3000 bridge optimizes throughput by encapsulating traffic in X.25 format, enabling the bridges to bypass the collision and contention inherent in Ethernet.

Formatting data in X.25 also enables the bridge to maintain full-duplex links so the bandwidth of the box can be utilized in both directions.

By using dedicated logic to perform data transfer instead of the bridge's Motorola Corp. 68010 microprocessor, the bridge can transfer 7,300 packet/sec and has a filtering rate of 14,800 packet/sec.

In an interactive Ethernet environment, contention limits the number of packets an Ethernet can generate to approximately 6,000 per second, Weiss claimed.

Less CPU decision making

The bridge's CPU only decides whether each packet should be forwarded over the wide-area link. Using the CPU for decision-making and packet-transfer functions would degrade performance, Weiss said.

The 3000 Series T-2 Bridge, like most Ethernet bridges, uses the Spanning Tree Algorithm to learn the network topology and establish a single path for packet traffic.

The algorithm also finds alternate paths in the event of a failure.

Custom filtering

A custom-filtering feature enables the system administrator to restrict source and destination routing for security reasons. Support of the Data Encryption Standard with ANSI X9.17 key management is offered as an optional security feature.

Cryptall's 3000 Series T-2 Bridge is available now; it costs $11,995. The encryption facility costs $1,500.

Cryptall can be reached in writing at 1110 Wellington Ave., Cranston, R.I. 02910, or by calling (401) 941-7600.

First Look

continued from page 41

personal computer adapter card that simultaneously supports 4M or 16M bit/sec token-ring connectivity, 3270 emulation and user applications on DOS workstations.

The **6150 RAManager** is targeted at personal computer users that have reached or anticipate reaching the memory capacity of their microcomputer or users who need both token-ring and host connectivity via 3270 emulation.

The card fits in a single slot of an IBM Personal Computer, Personal Computer XT or Personal Computer AT, as well as Personal System/2 Models 25 and 30. The card supports either shielded or unshielded twisted-pair wiring and conforms to IEEE 802.5 and 802.2 standards.

HLS' circuitry enables the board to accommodate up to 8M bytes of memory, which can support execution of 802.2 and Network Basic I/O System protocols, obviating the need for additional memory cards.

Scheduled to ship in the first quarter of 1990, the 6150 RAManager costs $1,195 per card.

Hughes LAN Systems, 1225 Charleston Road, Mountain View, Calif. 94043; (415) 966-7300.

Microtronix Datacom unveils PAD that acts as FEP for VAXes

Microtronix Datacom, Ltd. recently introduced a packet assembler/disassembler that acts as a front-end processor for Digital Equipment Corp.'s VAX minicomputers.

The **LSI-X.25 Ethernet FEP** links up to five X.25 19.2K bit/sec trunks supporting up to 128 logical ports to a DEC VAX via a standard Ethernet connection. When only one X.25 trunk is used, the device can support speeds up to 56K bit/sec.

Host-based software works with software running on the LSI-X.25 Ethernet front-end processor to handle data routing.

Remote terminals appear to the host as dial-up modem connections on an asynchronous port.

The LSI-X.25 Ethernet FEP can be used in conjunction with remote PADs acting as local terminal servers, including the Microtronix CSI-X.25 PAD, which supports up to 16 terminals and two X.25 trunks.

Available now, the LSI-X.25 Ethernet FEP is priced at $20,000 and up, depending on configuration.

Microtronix Datacom, Ltd., 125 Bessemer Road, London, Ontario, Canada N6E 1P9; (519) 681-3430.

Priam unveils two new versions of its Priam ND System

At the recent NetWorld '89 in Dallas, **Priam Corp.** introduced two versions of the **Priam Network Drive (ND) System,** an external hard disk subsystem with an AT-bus Small Computer System Interface (SCSI) host adapter and a Novell, Inc.-certified Value Added Disk Driver (VADD).

The ND330 and the ND670 have 330M and 670M bytes of memory, respectively, and can be integrated into Novell NetWare networks via the VADD, which is preformatted for NetWare.

The ND system, which has an average data transfer rate of 10M bit/sec, will be able to accommodate demanding applications such as computer-aided design, desktop publishing and data base management, the company said.

Evaluation units are available now, with volume shipments scheduled to begin later this year. The ND330 is priced at $4,750, and the ND670 is priced at $7,950.

Priam Corp., 350 E. Plumeria, San Jose, Calif. 95134; (408) 434-9300.

VMX introduces voice-processing system

continued from page 41

mote VMX systems have to preface the mailbox number with a location code and can designate whether the message should be delivered immediately or overnight to take advantage of lower transmission costs.

The system typically informs users of messages received by calling their extension. It can also light message-waiting lights if integrated with a PBX or Centrex system supporting that function.

The capability to send interoffice messages over networked VMX systems will be a major benefit to users, according to Chambers.

VMX customers with multiple locations often rely on telephone calls or internal memos to communicate with branch locations, Chambers said.

"Now, with one message, a user can reach everybody in headquarters and the field, and all departments can be operating in lockstep," he said. "This means better internal communications and higher management team performance."

Continuous monitoring

A continuous monitoring function is built into the VMX 100 to measure performance in real time.

It also has a hardware error table to track internal functions.

A VMX technician can dial in from a remote site and access this table to determine the severity of a problem.

The system is also capable of automatically placing a call to the hardware distributor in the event of a problem that requires on-site service, Chambers said.

VMX 100 is available now. Prices range from $8,000 for the two-port configuration to $25,000 for eight ports.

VMX can be reached by writing to 110 Rose Orchard Way, San Jose, Calif. 95134, or by calling (408) 943-0878.

OUR V.32 MODEMS WERE DESIGNED TO GO THROUGH HELL TO KEEP INFORMATION MOVING.

It's not unusual for temperatures to hit 110 degrees while ash rains from the sky at a typical fire camp. Lives are on the line. Your equipment better be up and running.

When the U.S. Forest Service decided upon NEC V.32 modems to help organize and transmit the massive amount of information necessary to move people and equipment, provide situation reports, coordinate air drops, and handle logistics, it was no fluke.

A major reason they chose NEC 9630 modems was their ability to transmit at the highest possible speed, virtually error-free, even over worst case lines.


N9631

Aside from that, our modems were carefully scrutinized for functionality, compatibility with existing equipment, ease-of-use and overall quality.


N9635

Obviously we passed the test.


N9630

When it comes time for you to decide which V.32 modem best fits your needs, be aware that no one has a more complete line than we do.

From the economical N9631 to the sophisticated N9635, you'll find advanced features such as remote configuration and monitoring, auto dial back-up, and complete diagnostics to name a few. To find out more, call us at 1-800-222-4NEC ext. 1277.

We realize you may never push your modems to the extremes the U.S. Forest Service does, but we're experts at putting out fires in business, too.

Photo courtesy of United States Forestry Services.

NEC

See us at TCA booth #706 in the annex, Sept. 26-29.

OPINIONS

JUNK

BY STUART BROTMAN

Proposed law spells relief from unwanted messages

The Telecommunications Subcommittee of the U.S. House of Representatives has finally mobilized to combat a problem as prevalent as ring-around-the-collar. The Telephone Advertising Regulation Act, a bipartisan effort, is aimed at regulating junk telephone calls and their younger but equally nasty sibling, junk facsimile transmission. It's about time.

Who hasn't experienced the annoyance of answering the telephone only to find a gremlin of technology on the line? A disembodied voice, generated by a machine programmed to make 50 or 100 calls an hour, bellows on about the dream vacation you've just won or why aluminum siding will make all your troubles go away. Unfortunately, slamming the receiver down won't get rid of the offender. Lacking mortality, the voice continues until it chooses to stop, keeping you from making calls and preventing others from reaching you.

> Less than half of all states have legislation that deals with telephone solicitation.
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The junk fax phenomenon is equally troubling. The fax machine in recent years has blossomed as a useful instrument for virtually instantaneous written communication between parties across town or around the world. Leave it to some clever entrepreneurs to envision the population of those with fax machines as, of all things, a marketing opportunity.

Armed with more sophisticated fax machines that can broadcast dozens of messages at a time, another group of telephone renegades has arrived. Reams of fax paper now must be paid for by the reluctant recipients, who wind up shredding the unwanted messages as soon as they're received. And in the business world, where time is money, tying up a fax machine with unsolicited messages prompts real bottom-line concerns as well.

Valiant state legislators have been trying to combat these dual menaces but, frankly, it is often a matter of too little, too late. Less than half of all states have enacted legislation or regulatory provisions that deal with telephone solicitation; none to date have passed laws limiting the use of fax machines.

That's why the zapping effect of The Telephone Advertising Regulation Act can bring relief to millions of Americans while still respecting the aims of those on the other end who believe the values of a free enterprise system should prevail. Currently being reviewed by the House Energy and Commerce Committee after its approval by the Telecommunications Subcommittee, the act would empower those who have a telephone or fax machine to "Just say no."

The legislation would require the Federal Communications Commission to create a national clearinghouse that would compile and maintain lists of individuals who do not want to receive junk telephone calls and fax messages. The cost for running this clearinghouse would not come from tax dollars, but rather from telemarketers, who would pay to get access to these lists in order to weed out those who are only willing to buy when hell freezes over. In other words, everyone wins.

The bill also includes some additional provisions, such as requiring the FCC to set technical standards for autodialing and fax machines. These standards, for example, could force telemarketers to identify themselves at the outset and ensure that a receiving party's line is released within five seconds after the calling party has performed the proverbial slam dunk.

Such details, however, are merely icing on the cake — or overkill, depending upon which side of the line you're on.

Brotman is a Boston-based communications lawyer and management consultant.

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EDITORIAL

Farewell to a respected regulator

In this deregulatory era, regulators are often unfairly portrayed as stodgy bureaucrats sitting behind gunmetal gray desks and creating new rules, each one more cumbersome and inefficient than the last.

There have been a few regulators over the years who were not particularly adept at carrying out their responsibilities. But to be fair, regulators have a largely thankless job. They're pushed and pulled by Congress, the courts, fellow regulators and corporations. Their skills and knowledge must span a wide range of disciplines, especially technology, law and politics.

Regulators must also be willing to accept salaries that are about half of what their colleagues in the private sector are paid. It's a wonder that any regulator keeps sight of the public interest in this atmosphere.

Federal Communications Commissioner Patricia Diaz Dennis was one of those rare regulators who never forgot she was there to serve the public. Her term expired in June, and at the end of this week, she will return to the private sector as head of the communications section at the Washington, D.C. law firm Jones, Day, Reavis & Pogue.

Diaz Dennis was a member of the National Labor Relations Board for three years before joining the FCC in 1986. Although she was most vocal on common carrier issues, Diaz Dennis' background also made her thoroughly familiar with broadcast issues. From 1979 to 1983, she was an assistant general attorney for the American Broadcasting Company.

Diaz Dennis was born in New Mexico and went to school in California. In Washington, where careers are often made by going to the right Ivy League college or by coming from the right family, this made her something of a political outsider.

> She was often opposed by powerful companies, but almost everyone who met with her thought they got a fair hearing.
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Maybe that's why she was always willing to speak her mind — a trait that frequently put her at odds with FCC Chairman Dennis Patrick, who had complete faith in the marketplace as an infallible decision maker if freed from the burden of regulation.

Diaz Dennis was so disturbed by some decisions issued by the FCC's majority of two that she issued statements disassociating herself from them. For example, when the FCC allowed AT&T to offer Tariff 12 arrangements, Diaz Dennis said the public interest is not served by an FCC decision based on such a swampy foundation that it might well be overturned after a lengthy court battle.

She also questioned how the public interest would be served by allowing AT&T to proceed with Tariff 15, which allows the carrier to respond to competitors' off-tariff offers. Such arrangements enable AT&T to charge different rates for the same service, even though this type of discrimination seems to be clearly prohibited by the Communications Act of 1934.

Nearly everyone in Washington who ever dealt with Diaz Dennis confesses respect for her, albeit grudgingly in some cases. She was often opposed by powerful companies on major issues, but almost everyone who met her felt they got a fair hearing. This quality was particularly admirable since she served at the agency during one of its most politicized, ideologically driven periods.

Diaz Dennis was also respected because she did her homework. Immediately after joining the commission, she studied hard to learn the complex issues she would be asked to vote on. Any time she held a meeting, she was prepared, file in hand, to discuss the issues.

Maybe regulation wouldn't have such a bad name in this country if there were more regulators like Diaz Dennis. Whoever replaces her at the FCC will have very big shoes to fill.

OPINIONS

BUZZWORDS

BY ED WARD

Technology pushers may be hazardous to corporate health

"Technology push and market pull" is the latest industry concept. Oh, it still ranks somewhere below "strategic," "integrated" and "enterprise" in the official *Consultants' Book of Magic Incantations,* but it's clearly gaining ground. It is being bandied in more and more conferences and seminars to explain why some pet prediction or forecast will come to pass, and it would be just part of the general conceptual clutter in the industry except for one thing: It's a lie.

"Technology push" doesn't exist. There is only market pull. The concept of balancing forces — push and pull — is appealing; it somehow seems more complete and natural than either force by itself, like yin and yang. But that only makes it an appealing, well-balanced lie.

Not that there's anything inherently wrong with lies; simplistic models may sometimes be inaccurate but still manage to reduce complex concepts to manageable terms. False explanations only become dangerous when we begin basing actions on them: A child's belief in the tooth fairy is normal and harmless — unless the child starts pulling teeth for extra spending money.

The concept of technology push and market pull is now being voiced so often and from such respected sources that a growing danger exists: Someone may actually begin to believe in it. Worse, someone may rely on it for strategic planning. Telecommunications planning is difficult enough without the added confusion of a false premise. Now is the time to exorcise that myth.

Economics, for example, recognizes the forces of supply and demand, not push and demand. The effect of supply is wholly dependent on demand, or market pull. If there is no demand for the product, the result is an unused surplus, not pressure on consumers to use more. So the critical factor in assessing the effect of any new technology is the presence of an identifiable business need, a market.

One source of confusion over the role of technology is that many people in the industry mistake invention for innovation. Innovation changes the way people do things; invention merely presents another way that things could be done. Invention creates no change by itself, but if it meets some market need, it may result in innovation. On the other hand, some new way of doing things that meets a market need can become a true innovation, even if there is no new technology involved — no invention.

For instance, a recently invented salon hair dryer that dries hair in five minutes instead of 30 was never produced because salons count on having 30 minutes to get the next customer ready. There was no market, no change in the way things are done — no innovation.

> False explanations only become dangerous when we begin basing actions on them.
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Within our own industry, Satellite Business Systems embraced satellite technology at a time when the space shuttle had captured America's imagination. Although IBM — perhaps the finest marketing organization ever developed — promoted it, it failed. New technology, but no market: push without pull.

On the other hand, American Airlines, Inc. completely revolutionized the airline industry with the introduction of SABRE. Using SABRE to establish ties between the airline and individual travel agencies is the foremost textbook example of applying telecommunications technology for strategic advantage, one that has withstood the combined effects of time and the deregulation of both the telecommunications and the airline industries.

Yet SABRE was a relatively simple system that relied on existing, proven telecommunications technology — modems and analog lines — to develop a totally new way of doing business. A case of innovation without invention, market pull without technology push.

Another source of confusion about the role of technology push in shaping the future of telecommunications is the corps of techno-crows in the industry, who are irresistibly drawn to the gleam of each bright, shining bauble of technology. They have found that new technology can be fun and exciting to play with, but they mistake their interest in it for some larger imperative that technology, once found, must be used. These are generally bright and well-meaning folks who have simply mistaken good fun for good business.

But good business cannot base its forecasting on the push of technology. Technology does not push; at its best, it enables. It can provide a wider range of options to address business problems, but telecommunications managers evaluating the future of their networks must base their projections on the pulls of their specific markets, not the push of some promised technology.

What feels like the push of technology is too often nothing more than a nudge from some industry expert, warning that if your competitors implement their new pet technology before you do, they will automatically seize an insurmountable competitive advantage.

In the real world, planning based on this kind of push frequently results in an organization investing in new communications technologies that merely enhance the network but do not improve the flow of information, which is the business of the network.

Innovation is still the result of the skillful application of technology, not technology itself. Success still requires that managers thoroughly learn the business their networks support and have the imagination to find better ways to support and expand that business — whether through new technology or old.

So the next time someone paints a picture of the future based on the push of some hot, new technology, sit down, have a drink and try a little experiment. First, put a straw in your drink and try sipping a little of it. Next, put your hand in the glass and try pushing the drink up through the straw. Then decide for yourself which is more effective: push or pull.

Ward is network services manager at American Management Systems in Arlington, Va.

TELETOONS

BY FRANK AND TROISE

LETTERS

Buy that man a Bud

In my letter to the editor ("A simple answer?" *NW,* Sept. 11), I stated that a wealth of information is available that explains how to solve "the puzzle of independent logical unit support."

It seems Joe Mohen, who responded to the letter, did not take the time to peruse the reference provided in that letter. I will, therefore, directly answer his question, "What specifically indicates to the Network Control Program (NCP) and VTAM that the node it is communicating with is PU 2.1 or PU 2.0?"

The NCP gen parameter XID=YES indicates to the NCP (and indirectly to VTAM) that a physical unit may be PU 2.1-capable. This causes the NCP to send a NULL XID command to the physical unit at physical unit activation time to determine its capability.

If a physical unit responds with an XID Type 3, then the NCP and VTAM will assume the physical unit is a 2.1 node

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Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *375 Cochituate Road, Box 9171, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

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Columns should be timely, opinionated, literate, thoughtful and accurate.

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If you'd like to write a column, call Steve Moore, features editor, at (508) 820-2543, ext. 732, or fax your idea to us at (508) 879-3167.

The race is on

CONTINUED FROM PAGE 1
driving CCS7 deployment in the public network today. First, the in-band trunk signaling systems widely used by exchange carriers for central office-to-central office signaling throughout North America are physically too slow.

The complexity of the carrier services today requires a more robust signaling system. A CCS7 signaling channel runs at a higher speed because it has a greater bandwidth — 56K or 64K bit/sec. All line, supervision, interregister and maintenance signals are binary encoded and made up into signal units optimized for digital links at 56K or 64K bit/sec. The signal information field may be up to 279 octets in length.

Second, the older signaling systems do not have a very sophisticated interoffice signaling capability. Carriers fear that new services — particularly Integrated Services Digital Network — are going to require the exchange of information elements, thereby exceeding the present signaling systems' capability to service calls between the various central office and tandem switches.

Modern central office services are beginning to require that many kinds of information messages pass between the switching nodes. The signaling system's role in transmitting end-to-end information dictates that it have some of the same characteristics as a reliable data protocol.

The status quo

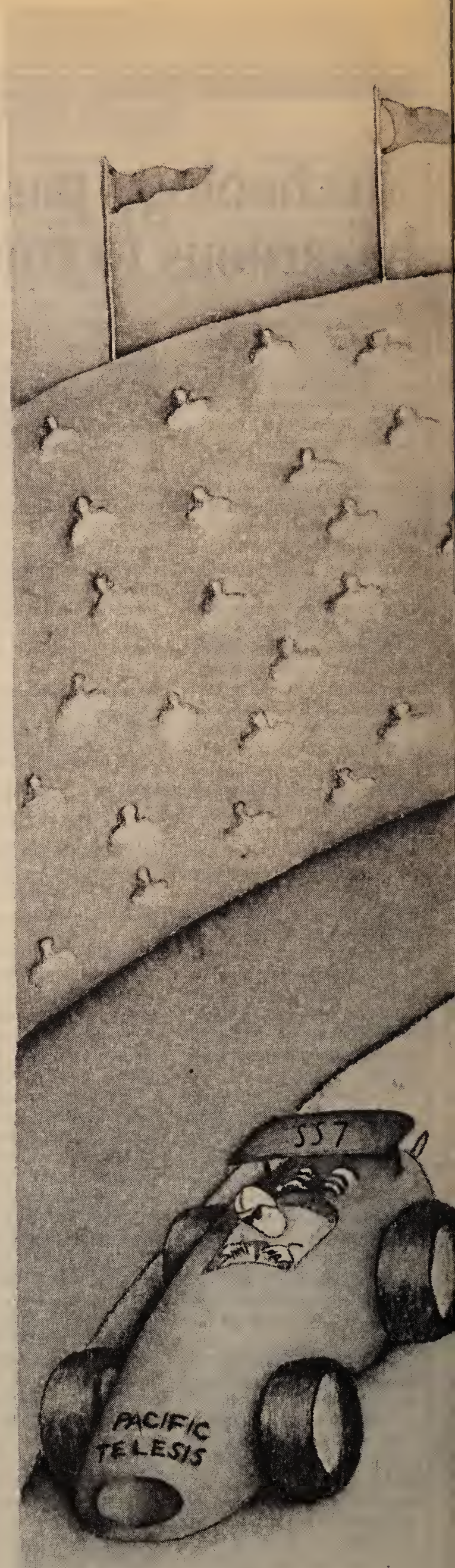
Most U.S. carriers are currently deploying CCS7 throughout their service areas. Last fall, US Sprint Communications Co. became the first interexchange carrier to deploy CCS7 fully in all of its switches. US Sprint's 41 Northern Telecom, Inc. DMS-250s provide more than 1,000 trunks for SS7 signaling in its domestic network. The carrier is now equipping its international gateways — two Northern Telecom DMS-300s — with both the ANSI and CCITT versions of SS7.

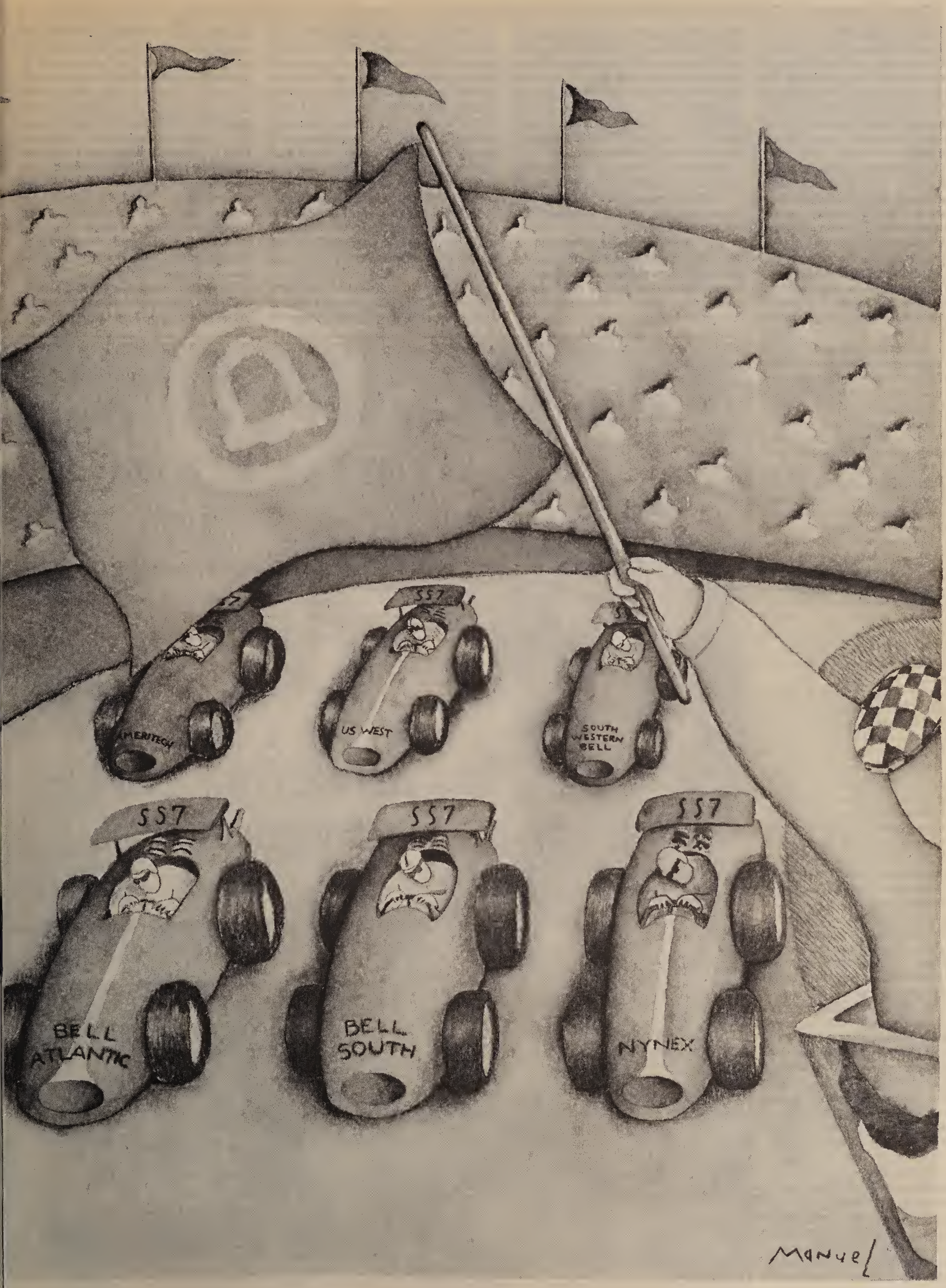
US Sprint is using the new signaling system to access feature data bases, US Sprint's term for

(continued on page 50)

Gawdun is a free-lance writer based in Nashua, N.H.

Carriers are eager to complete full CCS7 deployment in the U.S.

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service control points, which provide translations for 800 services, authorization code lookups and other features. The benefits US Sprint derives from CCS7 deployment include greater customer satisfaction among virtual private network users and reduced access charges by the exchange carriers.

MCI Communications Corp. has fully deployed CCS7 for interoffice trunk switching. Installation was completed for the tandem level in March and for the rest of the network switches in April. MCI's call setup and disconnect time was also reduced significantly after the carrier implemented the new signaling technology.

AT&T deployed the first common channel signaling system in the U.S. when it rolled out Common Channel Interoffice Signaling, a variant of CCITT Signaling System 6. The carrier has had common channel signaling in one form or another since 1976; CCS7 only represents an improvement to the existing out-of-band signaling techniques that have been fully deployed for over 12 years.

AT&T is in the middle of a transition to CCS7, with the objective of completing deployment by the end of 1989. Although AT&T's motivation for moving to CCS7 may not seem as high as its competitors, the carrier is fully capable of handling all of the CCS7 services available today.

"The AT&T carrier network is more robust than either carrier networks from MCI or US Sprint," says Thomas Nolle, president of CIMI, a consulting company in Haddonfield, N.J. "AT&T has more switching devices, more trunk density and is more highly interconnected. It is possible that AT&T is able to achieve satisfactory call setup speeds in its network without resorting to CCS7 technology."

Among the independent telephone companies, GTE Communications Corp. and Cincinnati Bell Telephone have committed to deploying CCS7 to end offices. By 1992, GTE Communications plans to have 70% of its access lines serviced by end offices with CCS7 and more than 90% by 1995. Cincinnati Bell plans to have CCS7 at its end offices by 1990.

CCS7 is also being deployed in the end offices of rural America by the Independent Telecommunications Network, Inc. (ITN), an association comprised of US Intelco Networks, Inc., 35 independent telephone companies and a consortium of other independent telephone companies.

US Intelco Networks sponsored the creation of ITN as a separate company to deploy SIGNET 7, a CCS7 network over which US Intelco Networks would offer services nationwide to independents in the same manner that CCS7 is provided to the Bell operating companies by their parent regional Bell holding companies.

Through the ITN consortium, many small independent telephone companies will be able provide new services to users that they could not economically provide by themselves. Eventually, ITN hopes to be able to sign up 900 independent telephone companies for CCS7 services.

Deployment interest

The interest in end office deployment is very high, especially among small independent telephone companies located in the suburbs of the large metropolitan areas where an RBHC is going to roll out CCS7 services. Other independents outside the metropolitan areas have already formed regional associations for obtaining CCS7 services from ITN.

According to Dennis Byrne, executive director of operations and engineering for the U.S. Telephone Association, the smaller independent telephone companies need only install their own service switching point functions and a link to ITN through an interexchange carrier. The service switching point allows a switch to communicate with the rest of the CCS7 network through a signal transfer point.

Participating member independent telephone companies will be able to use the CCS7 network to provide 800 data base service and other intelligent network services.

CCS7 deployment varies greatly among the larger exchange carriers. Some are deploying CCS7 very aggressively all the way to their end offices because they want to offer services that create additional revenue.

"Bell Atlantic Corp. has been the most ambitious among the RBHCs and claims that over 80% of its COs will be equipped to serve 54% of their access lines by the end of this year," says John Celentano, a consultant with Northern Business Information in New York. Bell Atlantic will jointly provide CLASS services in New Jersey with United Telecommunications, Inc. of Kansas City, Mo.

BellSouth Corp. also will pursue an aggressive deployment schedule and intends to have CCS7 in end offices to serve 29% of its access lines, according to information contained in the most recent Federal Communications Commission ruling on Docket 86-10.

US West, Inc. indicates that 70% of its 800 service traffic will originate from end offices with CCS7 by 1995, and Ameritech expects to have 170 of its end offices running CCS7 by 1992. Other RBHCs have not yet publicly announced an established schedule for CCS7 end office deployment.

For the most part, the RBHCs have CCS7 deployed in their tandem access switches. US West has CCS7 capabilities at 50 of its tandem access switches. Like most RBHCs, US West will deploy CCS7 in the end offices throughout its territory after determining the economic feasibility of the technology.

CCS7 deployment in the end offices will depend heavily on cost justification. Not all of the RBHCs can justify the cost of fully deploying CCS7 in their end offices at this time.

In the first phase, many RBHCs will be deploying SS7 for internal use, primarily for intra-local access and transport area

traffic. In the second phase, the RBHCs will be able to interconnect with the interexchange carriers.

"The inability to interconnect between the RBHCs and the interexchange carriers is the biggest obstacle to ubiquitous end-to-end CCS7 deployment," says Nanci Adler, a consultant with Technologies Management, Inc. in Winter Park, Fla.

"Although all interexchange carriers and RBHCs are working very hard to implement CCS7, services such as the 800 data base access will not work or be completely functional until CCS7 is fully deployed and running on the RBHCs' access tandems or end offices," she says.

The first interworking trials between an RBHC and interexchange carriers will begin at the end of this year and will last until June 1990. "The purpose of the trial is to find out if there are any significant interoperability issues for passing CCS7 information between various manufacturers, central office switches and an interexchange carrier's network," says Eric Castillo, staff manager of network planning for BellSouth.

The initial phase of the trial will determine if the software developed by Northern Telecom for its DMS family of network switches will operate according to BellSouth's requirements. In the second phase, BellSouth will test the interworking among the Northern Telecom switches in the Southern Bell Telephone and Telegraph Co., South Central Bell Telephone Co. and AT&T networks.

Interexchange carriers participating in the second phase include AT&T, MCI and US Sprint. Bell Communications Research of Livingston, N.J., is helping to administer the trial, and the appropriate results will be released to the rest of the industry. The interworking interfaces that will be tested are specified in BELLCORE TR-TSY-000394, a technical requirements publication.

CCS7-based services

One of the basic services available today on CCS7 is alternate billing. The carriers use the line information data base for calling card verification as well as for collect and third-party billing, all of which are referred to as alternate billing services.

Today, the RBHCs lease access to the calling card verification system owned by AT&T. A CCS7-based alternate billing service allows the billing data to be moved to the RBHCs' data bases so that they can verify their own calling cards.

Another capability available with CCS7 is the 800 data base service, which is not as restrictive as the current 800 services. The existing 800 services are an interim solution approved by U.S. District Court Judge Harold Greene to allow interexchange carriers to compete in the 800 services marketplace. The 800 services are based on NXX codes that are assigned by BELLCORE.

The NXX codes are uniquely assigned to interexchange carriers; customers cannot change carriers without changing their 800 number. Currently, the 800 call routing is done according to the NXX code. For example, if a business user today has an 800 number, the company cannot take advantage of a lower time-of-day tariff offering from another interexchange carrier to transport the call.

With a CCS7-based 800 data base, it is conceivable that a company would have its 800 calls routed through AT&T between the hours of 8 a.m. and 5 p.m., through US Sprint between the hours of 5 p.m. and midnight, and through MCI or another carrier between midnight and 8 a.m.

This time-of-day routing capability allows a business user to lower the cost of 800 calls by having them transported by the least expensive carrier chosen by the customer for a particular time of day. Although the RBHCs have the technical capabilities to provide such features, whether they will be allowed to offer them is still an open regulatory issue.

Originally, US West and the other RBHCs were planning to offer 800 data base exchange access service to the interexchange carriers in 1988. But a number of companies raised their concerns, and the FCC has not mandated that the service be offered.

One of the issues brought up by the user community and the intervening companies is postdial delay. Because CCS7 for 800 service is deployed only at the tandem switch level and CCS7-based call setup to interexchange carriers is not yet available, the call cannot be sent to the interexchange carrier until the last digit is dialed and a data base query is performed to identify the interexchange carrier.

This causes a slight delay in the call setup of about five to seven seconds. By 1990 or 1991, software will become available so that exchange carriers can use CCS7 signaling to interconnect with the interexchange carriers. As more exchange carriers implement the software, the access time for 800 calls will be reduced by approximately four seconds. When CCS7 is deployed to the end offices, access time will be either less than or equal to what it is under the current NXX plan.

CPN and ANI

One of the features of CLASS is the individual calling line identification, which identifies the caller to the called party while the telephone is ringing. A special terminal with a built-in LCD can be attached to older telephones, or users can purchase a new telephone with an LCD and functions already built into the set.

The calling party's identity can be transmitted by the service provider as the directory number, which is known as the Calling Party Number (CPN), or as the billing number, which is known as automatic number identification (ANI).

Today there are several different ways of providing CPN to end users. Some techniques use a piece of terminal equipment and in-band, multifrequency signaling

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technology to derive the calling number. In most cases, these techniques are available on an intraswitch basis; only the called parties attached to the local exchange are able to know who is calling.

Where CCS7 exists, it is possible to deliver CPN on an interswitch basis by using the out-of-band signaling channel that carries the control and address information. CCS7 is the only interswitch technology capable of delivering CPN. The CPN, or directory number, in an SS7 message is called the calling party number parameter.

The growth of CPN, however, will be limited to private networks unless CCS7 becomes available at all end offices and the calling number privacy issues are resolved.

Many private branch exchange users on private networks are able to receive the identity of the station or extension of the calling party if the PBXs in the network came from the same vendor. In an SS7 environment, station identification will also become possible on calls made through the public network between PBXs from different vendors.

According to Walt Roehr, an independent consultant with Telecommunications Networks Consulting in Reston, Va., the 32-bit message field of the SS7 protocol is fully capable of delivering the calling party number to the called party via the Q.931 protocol. This assumes that a demand exists to receive station identification from behind PBXs, that manufacturers agree to implement the Q.931 interface in the same way and that users will subscribe to ISDN services.

In the SS7 protocol, the charged number parameter (CNP) is the functional equivalent of ANI, which is used by telephone companies for billing purposes. The CNP allows the service provider to render its own bills by providing access to the charging information.

In a CCS7 interworking scenario, the ANI received from an end office through multifrequency signaling would be automatically converted to the CNP for transport to the interexchange carrier in an SS7 message. When all end offices have SS7, they will use CNP instead of ANI.

Today, both AT&T and MCI can deliver ANI by packetizing the in-band signaling information and transporting it through their networks on the out-of-band signaling channel. For example, MCI can transport ANI over its net as an out-of-band signal but can deliver ANI to the user's call terminating point as an in-band signal.

Users benefit because they can take advantage of ISDN capabilities without having to buy ISDN terminal equipment. With CCS7, there is no requirement to translate or convert the analog in-band signaling information.

CCS7 also supports ISDN services; however, most users will not communicate directly with the SS7 protocol on ISDN access links. Instead, they will use a Q.931 protocol between their premises equipment and the central office. This ISDN protocol relays requests to other switches using the SS7 formats established in the Q.700 series of protocols. An ISDN connection cannot be made unless there is cooperation between the two different common channel signaling systems.

Currently, ISDN is predominantly an island technology; its availability is restricted to areas served by digital switch technology. Basically, the ISDN features and functions remain captives of those islands. With the availability of CCS7 support of ISDN, the various ISDN switches will become interconnected.

Deployment hurdles

The full benefit of CCS7 cannot be realized soon because the interexchange carriers and exchange carriers have not yet connected their CCS7 networks. All of the major interexchange carriers are actively negotiating with the RBHCs to determine how the CCS7 networks should interwork.

The discussions between interexchange carriers and exchange carriers are intended to ensure that all the carriers select SS7 protocol service options in the same way.

"There are no significant technical issues that would prevent interconnection of various carriers' CCS7 networks, assuming plant equipment availability," says Terry Pleasant, member of the technical staff for Technical Interconnection Planning at BELLCORE and moderator for the SS7 Workshop of the Industry Carriers' Compatibility Forum (ICCF).

"The time required to upgrade the [Public Switched Telephone Network] is the major factor affecting ubiquitous CCS7 deployment. The universe of switching nodes is so large in all of the carriers' nets that it is not practical to deploy SS7 functions to all switching devices in one year."

The majority of the switches in carrier networks do not have to be replaced at the moment. There are still nearly 1,800 1AESS switches in the exchange carriers' networks that will not be replaced in the foreseeable future. It is possible to have CCS7 on a 1AESS, but it is very expensive.

Although carriers perceive that no technical obstacles exist for interworking CCS7, a few issues must be resolved regarding ongoing operations of interconnected CCS7 networks.

"There are numerous operations and maintenance details that need to be worked out regarding the CCS7 interface," says Bill Vest, director of Network Fundamental Planning for US Sprint.

"Carriers still need to determine who is going to be responsible for provisioning the links, monitoring the grade of service, identifying the control office to perform tests on joint trunks and other issues," he continues. "Unfortunately, the operation, administration and maintenance of the CCS7 specifications was defined very late by BELLCORE. Today, this is the greatest area of interworking activity."

There is a perception in the industry and among end users that not all standards have been set for CCS7 between interex-

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(continued from page 52)
change carriers and exchange carriers.

"An ANSI standard exists for the main parts of the SS7 protocol, for the Message Transfer Part as well as the ISDN User Part, which handles the call setup. All of these standards have been adopted by ANSI and are reflected in BELLCORE Technical References used by all of the [exchange carriers]," says Bob Simms, head of the signaling systems engineering department at AT&T Bell Laboratories. Simms is responsible for technical planning for CCS7.

The Message Transfer Part represents the three lower layers of the SS7 protocol and interfaces directly with the call handling functions of the ISDN User Part.

Although there are standards that form the basis for interworking, there is a question about which options will be exercised by each carrier from among the many options available for the SS7 protocol.

Not all manufacturers will implement SS7 the same way. One equipment vendor may choose to implement a subset of SS7 features that may be slightly different from the subset of SS7 features available from another manufacturer.

"The testing and integration processes under way are going to resolve these types of issues," says John Robertson, head of the network architecture planning department at AT&T Bell Labs. Robertson is responsible for coordinating ISDN direction across all of the various business units within AT&T.

Carriers have additional requirements regarding the interconnection of their networks. All carriers want to protect themselves from spurious signals coming across their networks from other networks. They also want to make it easier for the administration of signaling across networks.

For example, when a carrier makes a change in its network, the signaling should be able to be handled without a lot of detailed knowledge of the other carriers' networks. The carriers must be able to perform screening, point code assignment, signaling network management and other functions that have been standardized in the T1S1 committee and are found in the BELLCORE Technical References.

End user concerns

If the carriers do not get their switches to interoperate soon, business users will be forced to bypass the exchange carriers to obtain the CCS7 functions they need from the interexchange carriers.

In some of the Fortune 100 companies that have enterprisewide networks, the telecommunications departments are buying Northern Telecom SL-100s or AT&T 5ESSs. Although these switches are being used like PBXs, they have the advantage of being able to use CCS7 for communicating directly with the long-distance network.

"Some large companies, especially the ones with customer service applications, are very seriously looking at plans to build private tandem networks on these switches and using CCS7 to create their own private 800 networks," says Mary Johnston, a consultant with Northeast Consulting Resources, Inc. in Boston.

"Large users who are concerned about gaining a two- or three-year competitive edge have an incentive for building CCS7-based networks without waiting for all the carriers to provide CCS7," she says.

Private network users are not the only ones who are interested in this type of capability. "The FTS-2000 network is another good example of a network that could become a large private CCS7-based network," Johnston says.

Notwithstanding the current logistical hurdles, the enormous complexity of the public network and unforeseen regulatory impediments, the full-scale deployment of CCS7 will occur throughout most of the ex-

> "Some large companies are looking at using CCS7 to create their own private 800 nets."
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changes in the U.S. by the mid-1990s, according to industry observers.

CCS7 is necessary for high-volume intelligent network services. These services represent the next generation of network services, such as 800 data base services, 900 services, virtual networks, calling card verification, LATA-wide Centrex and CLASS. Other potential services are network automatic call distribution, remote call forwarding, personal communications services, multimedia conferencing and network access to messaging services.

The services are called intelligent because the call-processing information does not reside in the network switches. Instead, it resides in other components such as Service Control Point data bases, which can communicate with other vital network components through CCS7.

The signaling system allows switches to perform look-ahead routing and other functions based on knowing the real-time status of the entire network.

If CCS7 is not deployed, carriers won't be able to offer ISDN and intelligent network services when users begin to demand them. Not having a robust signaling system will become a barrier to the provision of new services.

Because carriers believe that advanced services are the key to revenue-generating opportunities, they want to ensure that no obstacles exist to making the services available if public interest justifies their implementation. It would be economically unwise today for a carrier to purchase new equipment for its network without CCS7.

See The Faxnet Form On Page #79.

TELECOM

VOICE-MESSAGING SYSTEMS

By word of mouth

The voice mail mart is poised for continued growth.

Voice-messaging systems have changed somewhat over the past few years. They now offer capabilities that will help many companies increase overall operating efficiency. With transaction processing, for example, customers can determine the status of orders or place new ones without talking directly to the vendor.

Work is also under way to provide a common user interface standard that will permit experienced voice-messaging users to bypass the sometimes annoying and always time-consuming prompts that most systems require for leaving and retrieving messages (see "Press ? for more options, page 73).

Of considerable interest is the progress being made to enable disparate voice-messaging systems to be networked. Last year, many industry experts doubted that vendors and users would ever agree on that matter, but there's a chance that recommendations might be released by the end of this year. Those recommendations, however, will permit only very elementary networking; many problems still remain.

The regional Bell holding companies are also showing more than a passing interest in offering voice-messaging services to commercial and residential users. Pacific Bell, for example, is testing services aimed at both markets and has indicated that it will aggressively pursue commercial accounts. Southwestern Bell Corp. is going after the same market segments, drawing on the experience gained from tests it conducted last year in Missouri and Kansas.

The financial growth of the voice-messaging market also looks sunny. Vanguard Communications Corp., a Morristown, N.J.-based consulting firm, estimates that by 1993, the value of voice-messaging equipment shipped will be $1.2 billion, which represents a compound annual growth rate of 20%.

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CHART • GUIDE

A chart comparing voice mail products from a variety of vendors starts on page 58.

Hunter is president of TMS Corp., a telecommunications consulting firm in Wayne, Pa.

By JOHN HUNTER

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According to Liz Johnson, director of the voice processing institute for Vanguard Communications in Palo Alto, Calif., the number of systems shipped over the next three years will grow by 50% per year. In 1988, 11,000 systems were shipped; that number is projected to increase to 49,000 by 1993. "The reason the dollar value isn't growing at a higher rate is that lower priced low-end systems will experience increased shipment," Johnson says.

Probe Research, Inc. of Cedar Knolls, N.J., estimates that the value of 1988 shipments was $428 million but declines to release growth projections. (For information on the percentage of market share held by industry leaders, see the figure on page 57.)

Despite advanced features such as transaction processing, voice messaging is still used primarily to send, receive and copy messages, append answers or comments to them and then forward everything to other mailbox holders. Using an automatic call attendant to supplement the human operator is also popular. Voice-messaging systems integrated with PBXs can relieve the human operator from having to handle routine calls and waste time taking messages for unavailable parties.

The automated attendant answers the phone with either a company greeting or personal greeting. The caller then receives instructions on how to leave a message and, in some cases, is given options such as reviewing the message, altering it and marking it for immediate or deferred delivery. Most will also allow callers to transfer to another extension or have a live operator assist them.

Another popular use of voice-messaging systems is to dispense general information to callers. The bulletin board application, for example, allows customers to call in and hear recorded information. Some companies have also implemented audiotex services, where customers call and are given options for accessing information about a product or service.

Four levels of transaction processing

One growing application is transaction processing. Some vendors have different ideas as to what constitutes a transaction, however. To some, transaction processing allows a caller to give directions for a message to be broadcast to several mailbox holders.

Vanguard's Johnson says there are four levels of transaction processing. The first is forms fill-in, where the user receives voice prompts and speaks the answers. When mailbox holders play back their messages, they hear the voice response as one continuous conversation without the prompts. "All the major voice-messaging systems have forms fill-in," she states.

The next level of transaction processing is digit collection, which can be used to inform the mailbox holder that certain classes of employees have tried to get in touch. For example, salespeople can key in identification codes.

With the third level, account verification, the customer enters an account number and the purchase order or shipping order information, which, in turn, is passed to a data base stored on a host processor. A voice response then indicates the status of the order.

The fourth level, host accessing, permits customers to enter orders directly into the vendor's host computer. For example, the caller would enter an account number, the stock-item number and quantity desired and the voice-messaging system would send it directly to the host processor. This would eliminate any chance that an employee in the company would make a mistake entering the information.

However, keying in long strings of numbers on a push-button phone could be a rather tedious, frustrating process, especially if in entering several numbers, the user accidentally hits the wrong key. Users would have to reinitiate the call and start all over. A solution would be to give the user the option of reviewing the input before actually sending it.

> The number of systems shipped over the next three years will grow by 50% per year, according to Liz Johnson of Vanguard Communications.
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Some other features

A few companies are also offering facsimile processing. This allows users to be notified that a CCITT Group III-compliant message has been received or allows a message to be sent. It does not, however, convert the message to audio.

Some voice-messaging products have also instituted a busy-extension queuing facility, whereby a caller has the option of camping on rather than leaving a message in the mailbox. A few systems will also periodically inform users where they stand in the queue. Both facilities are much like the camp-on features available with most advanced PBXs.

All systems listed in the chart beginning on page 58 support public and private distribution lists, which allow messages to be sent automatically to other mailboxes without the sender entering every address. Public distribution lists are established by the system administrator and generally contain mailbox addresses of those who

routinely receive messages from a variety of users, for example, regional sales managers. Private distribution lists are established and used only by the owner.

Interfacing

Voice-messaging systems usually sit behind the PBX or Centrex and interface with the trunks and lines. The number of ports supported by the system indicate the simultaneous inputs that can be accommodated. Coder/decoders convert analog voice to digital signals and store the quantized voice on disks. For that reason, voice-messaging vendors quote their message-handling capacity in hours of storage, not bytes of storage.

The amount of storage needed to hold words depends on the quantization and data compression schemes used. Pulse code modulation, for example, uses 64K bit/sec for word conversion, while adaptive differential pulse code modulation (ADPCM) needs only 32K bit/sec.

Many vendors use proprietary schemes that digitize at 9.6K, 16K, 20K and 25K bit/sec to get even greater storage density. Digitizing at 20K bit/sec, for example, allows a 10M-byte disk to accommodate about one hour of voice messages.

A bone of contention among those attempting to establish disparate system networking is which quantization scheme to use. As will be discussed later, a temporary compromise has been established, but the matter is by no means closed.

Most voice-messaging systems are stand-alone units with their own hardware, software and disks. Firms such as Active Voice Corp., Applied Voice Technology, Inc., Boston Technology, Inc., Brooktrout Technology, Inc., Glenayre Electronics, Granite Telecom Corp., Innovative Technology, Inc., Harris Corp.'s Lanier Voice Products Division, Microlog Corp., Natural MicroSystems Corp., Talking Technology, Inc., Voicetek Corp. and Votan offer products that work with IBM Personal Computer ATs, XTs and compatibles and use their disks — but not the hardware and software — for message processing.

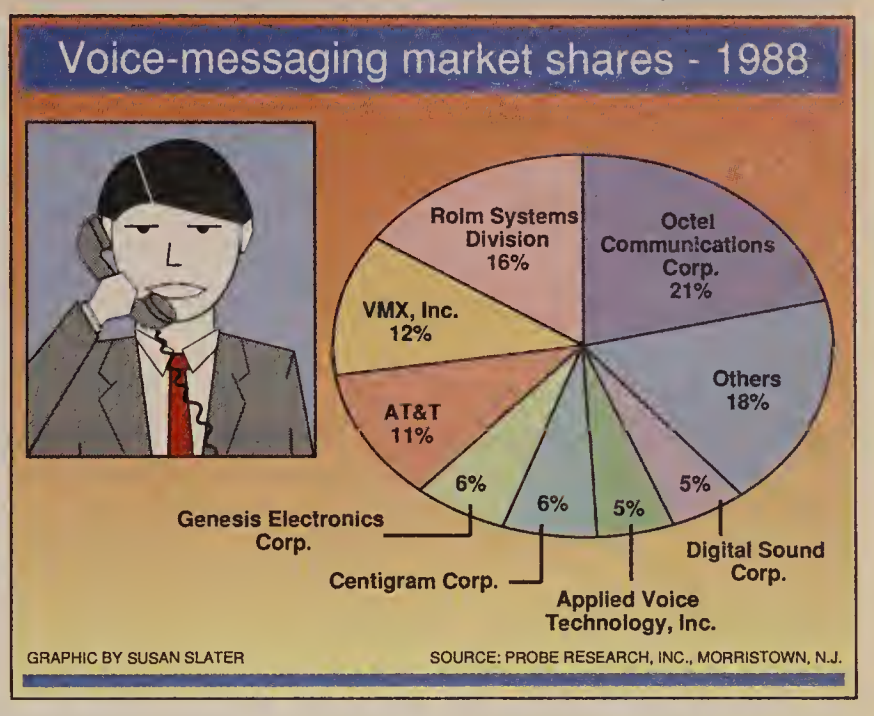
Like the stand-alone products, the personal computer-based units' storage capacity is determined by the disk space available and data compression scheme used.

Mailbox services

Aside from receiving messages, most systems allow users to respond to them by appending messages and directing the system to place the message in designated mailboxes. After leaving a message, some systems let the user specify immediate or deferred delivery and mark the message as private, thus preventing the recipient from sending it to other boxholders.

Some systems also support outcalling to remote locations such as home telephones. While the level of outcalling services varies somewhat among vendors, most support delivery based on date, time of day and urgency, and many support beeper services.

Many voice-messaging systems in the chart are integrated with the PBX. Therefore, they can use the PBX's facilities to invoke services such as activating the call-waiting indicator and transferring callers to the PBX operator. Sometimes, it's also possible to forward unanswered calls to a personal greeting that invites the caller to leave a message or transfer to another extension or voice-messaging service.



Voice-messaging systems can be networked only by linking similar systems. Tigon Corp. says it can communicate with disparate systems but does so by emulating services or through data conversion. Fed up with such restrictions, heavyweight voice-messaging users Eastman Kodak Co., The Coca-Cola Co., General Electric Co. and Johnson & Johnson used last year's International Communications Association conference to call for the establishment of a standard that will permit disparate systems to interoperate.

Goal: AMIS

The Information Industry Association is now sponsoring a study group made up, thus far, of about 40 of the most influential users, RBHCs and voice-messaging equipment vendors, all working to hammer out an interconnectivity recommendation. Hatfield Associates, Inc., a Boulder, Colo., telecommunications consulting firm, is managing the study group's efforts.

The end product will be the Audio Messaging Interchange Specification (AMIS). Jamshead Daroga, a communications analyst with Hatfield Associates, says the AMIS specification will consist of a protocol based on X.400 that uses a digital scheme for signaling between systems; recorded messages will be transmitted in encoded form.

That's fine, but what about analog systems? "The [study] group is also trying to come up with an analog scheme based on a very general call setup, and we'll discuss it along with the digital proposal at our mid-September meeting in San Diego," Daroga says.

According to Daroga, the AMIS recommendation will initially be concerned with message send, receive, reply and redirect attributes. Additionally, schemes for communications line testing and voice quantization are also going to be recommended. "AMIS will address line testing in the analog proposal, and the [study] group is recommending ADPCM as the digitizing scheme," Daroga says.

He emphasizes, however, that

(continued on page 62)

Service providers offer another alternative

Voice-messaging systems are not for every company. They're expensive, and the costs of maintenance and network management typically run into the tens of thousands of dollars per year. For those users not wanting to commit the bucks and personnel resources required for private networks, voice-messaging services are available that handle everything from establishing individual mailboxes to creating a network.

Public voice-messaging services are nothing new. Amvox Corp. of Los Gatos, Calif., Async Corp. of Atlanta, and Tigon Corp. and GTE TeleMessager, Inc., both of Dallas, have service centers in place today ("Not just answering machines," *NW,* Aug. 15, 1988). The Bell companies recognize the dollar potential of voice-messaging services and some — notably Pacific Bell and Southwestern Bell Corp. — are conducting tests now.

PacBell's plans

Pacific Bell is hotly pursuing commercial and residential accounts. According to Heidi Harris, director of voice-messaging products at Pacific Bell in San Ramon, Calif., commercial service tests are now going on in Los Angeles, San Diego, the San Francisco Bay area and Sacramento, Calif., and residential voice messaging is being tried in Milpitas and San Pedro, Calif.

Pacific Bell, Harris says, is hoping to bring large businesses into its fold. "We're pursuing large companies that no longer want the expense or bother associated with private networks," she says.

Currently, Pacific Bell's voice-messaging service offerings are available to Centrex, direct-inward dial (DID) and Simplified Message Desk Interface (SMDI) private branch exchange users. The company is also working on fully integrated PBX services, which it hopes to offer in a year or so.

Harris says that Pacific Bell can furnish private voice-messaging services such as personal greeting, distribution lists, message broadcast, message replay, message redirect and call forwarding. A stutter dial tone informs mailbox holders that messages are waiting and a message-waiting indicator light can be lit on some sets. Pagers can also be activated on DID systems.

Southwestern Bell is also making moves in the residential and commercial markets. "We see commercial as a big market and are looking at Centrex and DID as a means of providing services," says Phyllis Hoffman, Southwestern Bell's product manager for voice-messaging services. Last year, Southwestern Bell performed extensive residential voice-messaging service testing in Kirkwood City, Mo., and Kansas City, Kan., so they're not newcomers in the market.

Battle lines

Despite the Bell companies' aggressive plans to tackle the commercial market, they'll have to overcome the desire of many companies to have everything under in-house control. "It's going to be something like the Centrex vs. PBX battle," says Dave Torrey, vice-president of business development for Octel Communications Corp. "It depends on how much control [the Bell companies] want and what's going to be cheaper."

Mireille Dinant, a research analyst with Probe Research, Inc. in Morristown, N.J., agrees. "It's very expensive in dollars and time to maintain and administer [voice-messaging] systems, and companies may want an outsider like an RBHC to do it," she says.

There's no question that some companies, even large ones, will be more than happy to off-load voice-messaging responsibility to someone else, as is evidenced by Eastman Kodak Co., Ford Motor Co. and Intel Corp., all of which have signed up with Tigon.

"Those companies didn't want to be bothered with managing a large network, especially maintaining it," states David Keenan, Tigon's vice-president of marketing. Besides Tigon, Async, GTE TeleMessager and Amvox furnish turnkey services.

Price will tell

Price will be one of the ultimate factors determining whether a company will stay with private equipment or go with public offerings. Pacific Bell offers two plans for commercial customers. For SMDI interfacing, companies can choose fixed-capacity service, which is billed at $8 to $15 a month per user, or $10 a month per mailbox plus a message storage space charge of 10 cents per minute. For DID customers, the price is $19.95 a month per mailbox.

Those prices, of course, are subject to heavy discounting. "What companies are charged ultimately depends on usage; the higher volume users get the best price break," Harris states.

Roadblocks

While the local operating companies may be dead serious about capturing commercial accounts, they hit a dead end when it comes to inter-local access and transport area networking since the law prohibits carrier exchange interconnection. Even if it's permitted, there are questions as to whether or not the RBHCs will cooperate.

"If they all do, then a nationwide network could be established. But the questions are, will they cooperate and how will the network be controlled," says Chris Seelbach, a senior analyst with Probe Research.

Tigon's Keenan doesn't think RBHC cooperation is really that critical to success. "When the law permits it, an RBHC could set up a national network by establishing regional network centers in major U.S. cities and get a long-distance partner like Cable & Wireless [Communications, Inc.]. That's what we did, and our acquisition by Ameritech gave them an instant nationwide network."

Could Async and Amvox also be targets for aggressive RBHCs?

— John Hunter

NETWORK WORLD

Voice mail products

Vendor	Product	Port range	Hours of storage	Telephone interface	Automated attendant	Transaction processing support	Busy extension camp-on/queue position	Facsimile integration	Station message detail information supported	PBX integration	E-mail integration	Price range
Active Voice Corp. Seattle, Wash. (206) 441-4700	Repartee	2 to 16	1.5 to 30	Loop start	Standard	Forms fill-in	Both	Yes	Yes	1 through 21	No	$40,000 for 16 ports, 30 hours; $8,000 for 2 ports, 1.5 hours
American Telesystems, Inc. Atlanta, Ga. (404) 266-2500	Express Manager	2 to 48	2 to 220	Loop start, DID, E&M	Optional	Voice forms	Both	Fax received notification only	Yes	12, 13, 21, 22, 23, 24	Proprietary internal	$10,000 for 2 ports, 2 hours; $126,000 for 20 ports, 84 hours
Applied Voice Technology, Inc. Bellevue, Wash. (206) 820-6000	CallXpress 200	2 to 16	1.5 to 60	Loop start, DID	Optional	Forms fill-in	Both	No	Yes	2, 4, 8, 9, 11, 12, 13, 16, 17, 20, 21, 28	None	$7,000 for 2 ports, 1.5 hours; $90,000 for 16 ports, 60 hours
AT&T Bridgewater, N.J. (201) 221-0936	Audix	2 to 256	Up to 3,200 hours	Loop start	Standard	Digit collection, account verification, host processor interface	Neither	No	Yes	1, 12, 22	IBM Professional Office System and most other E-Mail systems	$38,000 for 4 ports, 13 hours; $229,000 for 32 ports, 104 hours
	Voice Power	1 to 12	Up to 35 hours	Loop start	Standard	Digit collection, account verification, host processor interface	Neither	No	No	System 25	No E-Mail	$16,000 for 1 port, 8 hours; $27,000 for 12 ports, 35 hours
Boston Technology, Inc. Cambridge, Mass. (617) 225-0500	Compact	4 to 16	2 to 20	Loop start; E&M and DID optional	Optional	None	Camp-on	No	Yes	12, 13, 25	None	$17,000 for 4 ports, 12 hours
	Access	4 to 32	5 to 110	Loop start; E&M and DID optional	Optional	None	Camp-on	No	Yes	12, 13, 25	None	$73,000 for 20 ports, 28 hours
Brooktrout Technology, Inc. Wellesley Hills, Mass. (617) 235-1106	Operator Plus	2 to 6	2 to 24	Loop start, E&M, DID	Standard	None	Neither	Yes	No	2, 7, 11, 12, 13, 16, 20, 21, 27	None	$6,000 for 2 ports, 2 hours; $30,000 for 6 ports, 24 hours
Comverse Technology, Inc. Woodbury, N.Y. (516) 921-0470	Trilogue Message Management System	4 to 32	8 to 180	Loop start, E&M, loop feed, earth recall	Optional	None	Neither	Yes	Yes	2, 12, 13, 16, 17, 22	NA	$35,000 for 4 ports, 8 hours; $185,000 for 32 ports, 70 hours
Digital Sound Corp. Santa Barbara, Calif. (805) 569-0700	Voice Server 2110	4 to 48	Up to 551	Loop start, ground start, DID, T-1, E&M	Optional	Forms fill-in, digit collection, account verification, host processor interface	Neither	No	Yes	2, 7, 11, 12, 13, 17, 26, 27	No	$375,000 for 48 ports, 540 hours
	Voice Server 1000	2-8	Up to 127	Loop start, ground start, DID, E&M	Optional	Forms fill-in, digit collection, account verification, host processor interface	Neither	No	Yes	2, 7, 11, 12, 13, 17, 22, 25, 26, 27	No	$16,000 for 2 ports, 16 hours; $35,000 for 8 ports, 24 hours
Dytel Corp. Schaumburg, Ill. (312) 519-9850	Dytel Call Processing System	4 to 96	3.5 to 1,000	Loop start, ground start, DID, T-1	Standard	Forms fill-in, digit collection, account verification, host processor interface	Both	No	Yes	1 through 29	None	$15,000 for 4 ports, 3.5 hours; $38,600 for 16 ports, 21 hours
Fujitsu Business Communications Systems Tempe, Ariz. (714) 630-7721	Voice Manager	2 or 4	2 or 5	Single line, loop start	Standard	None	Neither	No	No	7	No	$6,000 for 2 ports, 2 hours; $9,500 for 4 ports, 5 hours
Genesis Electronics Corp. Rancho Cordova, Calif. (916) 985-4050	Cindi II	2 to 8	2 to 21	Loop start, ground start, DID, E&M	Optional	Forms fill-in	Neither	No	Yes	2, 6, 7, 11, 12, 13, 16, 20, 23	No	$10,850 for 2 ports, 2 hours; $33,200 for 8 ports, 21 hours
	Cindi III	4 to 24	10 to 80	Loop start, ground start, E&M, DID	Optional	Forms fill-in	Both optional	No	Yes	2, 7, 11, 12, 13, 21, 23	No	$30,250 for 4 ports, 10 hours; $109,150 for 24 ports, 80 hours
Glenayre Electronics Atlanta, Ga. (404) 662-1840	Modular Voice Processor	4 to 128	22 to 528	DID, E&M	Standard	No	Neither	No	Yes	No	No	$90,000 for 8 ports, 22 hours; $193,200 for 32 ports, 88 hours
Granite Telecom Corp. Manchester, N.H. (603) 644-5500	Laverne	4 to 16	3.5 to 30	Loop start, ground start	Standard	Digit collection, account verification, host processor interface	Camp-on	No	Yes	2, 11, 12, 27	No	$7,600 for 4 ports, 3.5 hours; $22,600 for 16 ports, 10.5 hours
GTE TeleMessager, Inc. Irving, Texas (214) 929-7817	TMS 5000	8 to 64	30 to 258	Loop start, ground start, E&M, T-1	Optional	Forms fill-in	Neither	No	Yes	1 through 29	IBM PROFS, Digital Equipment Corp. All-In-1, audio text	$95,000 for 8 ports, 30 hours; $420,000 for 64 ports, 258 hours
	TeleMessager Interactive Voice Response	2 to 64	14 to 100	Loop start, ground start, DID, E&M	No	Forms fill-in, digit collection, account verification, host processor interface	Both	Yes	Yes	None	NA	$35,000 for 2 ports, 14 hours; $150,000 for 64 ports, 100 hours

This chart includes a representative selection of vendors in the voice mail market. Many vendors not included offer competitive products.

SOURCE: TMS CORP., DEVON, PA.

Voice mail products (continued)

Vendor	Product	Port range	Hours of storage	Telephone interface	Automated attendant	Transaction processing support	Busy extension camp-on/queue position	Facsimile integration	Station message detail information supported	PBX integration	E-mail integration	Price range
Innovative Technology, Inc. Roswell, Ga. (404) 998-9970	nitaReceptionist	4 to 24	1 to 20	Loop start	No	No	Neither	No	Yes	2, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 29	DEC VAX E-Mail	$12,000 for 4 ports, 1 hour; $30,000 for 24 ports, 20 hours
InteCom, Inc. Allen, Texas (214) 727-9141	InteMail	4 to 44	6 to 270	Loop start	Optional	Forms fill-in	Neither	No	No	25	No	$24,945 for 4 ports, 6 hours; $51,024 for 8 ports, 33 hours
Lanier Voice Products Atlanta, Ga. (404) 329-8000	Voice Relay	4 to 16	4 to 24	Loop start	Optional	Forms fill-in	Camp-on	No	Yes	2, 11, 21	No	$21,500 for 4 ports, 4 hours; $58,600 for 16 ports, 24 hours
	L.I.V.E.	2 to 4	Up to 4	Loop start	No	No	Neither	No	Yes	2, 11, 21	No	$10,250 for 2 ports, 4 hours; $12,250 for 4 ports, 4 hours
Microlog Corp. Germantown, Md. (301) 428-3227	VCS 3500	2 to 48	3.5 to 31.8	Loop start, ground start, E&M, T-1	Standard	Forms fill-in, digit collection	Both	No	No	None	None	$15,000 for 2 ports, 3.5 hours; $150,000 for 48 ports, 31.8 hours
Natural MicroSystems Corp. Natick, Mass. (508) 655-0700	Watson	1	User-selectable based on PC disk storage capacity	Loop start, ground start, DID, E&M	Optional	Forms fill-in	Both optional	Yes (optional)	Yes	2, 11, 12, 17, 27	No	$199 to $299 for 1 port
Northern Telecom, Inc. Santa Clara, Calif. (408) 988-5550	Meridian Mail	4 to 48	5 to 240	Meridian SL-1 network loop	Optional	Forms fill-in, digit collection, account verification, host processor interface	Camp-on	No	Yes	13	No	$19,000 for 4 ports, 5 hours; $247,000 for 48 ports, 240 hours
Octel Communications Corp. Milpitas, Calif. (408) 942-6500	Aspen	4 to 24	Up to 63	Loop start, ground start, DID, E&M	Standard	No	No	No	Yes	2, 7, 8, 11, 12, 13, 16, 17, 20, 21, 22, 23, 26, 27, 28	No	$53,000 for 4 ports, 5.5 hours; $259,000 for 24 ports, 145 hours
	Aspen Maxum	16 to 72	Up to 304	Loop start, ground start, DID, E&M	Standard	No	No	No	Yes	2, 7, 8, 11, 12, 13, 16, 17, 20, 21, 22, 23, 26, 27, 28	No	$163,000 for 16 ports, 17.5 hours; $583,000 for 72 ports, 304 hours
Talking Technology, Inc. Oakland, Calif. (415) 652-9600	Powerline	1 to 16	User-selectable based on PC disk capacity	Loop start, ground start	No	NA	Neither	No	No	NA	No	$300 per port; hours depends on PC used
TelPlus Communications, Inc. Boca Raton, Fla. (407) 997-3666	VOX 50	2 to 4	2 to 5	Loop start, ground start, DID, E&M	Standard	No	No	No	No	17	No	$9,600 for 2 ports, 2 hours; $14,000 for 4 ports, 5 hours
	VOX 500	4 to 8	5 to 21	Loop start, ground start, DID, E&M	Standard	No	No	No	No	17	No	$18,000 for 4 ports, 5 hours; $35,000 for 8 ports, 21 hours
TIE/Communications, Inc. Shelton, Conn. (203) 926-2000	1002	1 to 6	5 or 10	Loop start or ground start	Standard	Digit collection	Neither	No	Yes	No	No	$5,610 for 2 ports, 5 hours; $14,280 for 6 ports, 10 hours
VMX, Inc. San Jose, Calif. (408) 943-0878	VMX 5000	8 to 64	30 to 258	Loop start, ground start, DID, E&M	Optional	None	Neither	No	Yes	1 through 29	DEC All-In-1	$150,000 for 8 ports, 30 hours; $500,000 for 64 ports, 258 hours
	D.I.A.L.	2 to 16	2.5 to 33	Loop start, ground start, DID, E&M	Standard	Forms fill-in, digit collection for calculation, account verification, host processor interface	Both	No	Yes	1 through 29	No	$25,000 for 2 ports, 2.5 hours; $80,000 for 16 ports, 33 hours
Voice Systems & Services, Inc. Mannford, Okla. (918) 865-1000	Communicator	4 to 1,024	5 to 1,600	Loop start, ground start, DID, T-1	Standard	Optional	No	Yes	Yes	2, 11, 13	Novell, Inc.	$11,995 for 4 ports, 5 hours
Volcetek Corp. Chelmsford, Mass. (508) 250-9393	UTK-300	4 to 64	25 to 100	Loop start, ground start, DID, E&M, T-1	Optional	Forms fill-in, digit collection, account verification, host processor interface	Neither	Yes	Yes	13, 22	No	$62,175 for 4 ports, 25 hours; $180,350 for 64 ports, 100 hours
Votan Fremont, Calif. (415) 490-7600	TeleCenter	2 to 8	4 to 15	Loop start	Standard	Optional	Camp-on	No	NA	NA	No	$7,990 for 2 ports, 4 hours; $31,650 for 8 ports , 15 hours
Wang Laboratories, Inc. Lowell, Mass. (508) 459-5000	Wang Office/Voice Mail	4 to 140	Depends on size of host processor storage facilities	Loop start, ground start, E&M	Optional	No	Neither	No	No	Wang Business Exchange Central Office	Wang Office	$9,000 per 4-port increments; storage depends on disk space available
Xerox Corp. Rochester, N.Y. (716) 423-5579	Xerox Voice Message Exchange	2 to 64	16 to 258	Loop start, ground start	Optional	No	Neither	No	Yes	1 through 29	IBM PROFS, DEC All-in-1	$30,000 for 2 ports, 16 hours; $400,000 for 64 ports, 258 hours

DID = Direct inward dialing
NA = Information not available

1 = Alcatel Network Systems Corp.
2 = AT&T System/75
3 = AT&T Horizon
4 = AT&T Dimension
5 = Comdial Corp.
6 = Executone Business Systems
7 = Fujitsu Business Communications, Inc.
8 = GTE Communication Systems Corp.
9 = Intertel
10 = IWATSU America, Inc.
11 = Mitel Corp.
12 = NEC America, Inc.
13 = Northern Telecom, Inc.
14 = Panasonic Industrial Co.
15 = Premier
16 = IBM/Rolm Systems Division
17 = Siemens Communication Systems, Inc.
18 = Telrad
19 = Teltone Corp.
20 = TIE/Communications, Inc.
21 = Toshiba America, Inc.
22 = Centrex
23 = Harris Corp.
24 = Telcom Technologies
25 = InteCom, Inc.
26 = Hitachi America, Ltd.
27 = Ericsson
28 = ISOETEC Communications, Inc.
29 = ITT Corp.

This chart includes a representative selection of vendors in the voice mail market. Many vendors not included offer competitive products. Centigram Corp. is not listed in this chart because it did not provide complete information about its products by press time.

SOURCE: TMS CORP., DEVON, PA

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the quantization technique was not a closed issue and in the future, AMIS will consider the use of proprietary schemes. The group planned to address that topic at its September meeting in Toronto.

If everything goes well, the initial AMIS recommendation providing the basics for disparate voice-messaging connectivity will be released, at the earliest, by the end of this year or early next year. As for sophisticated features such as network management, Daroga says, "network management has come up in discussions, but AMIS will not attempt to define that until sometime in the future."

Something else AMIS won't define is the basic interface users will employ to access voice-messaging systems to leave, receive and save messages. As noted earlier, those procedures consist of prompts that experienced voice-messaging users would like to bypass to expedite the transaction.

> "Net management has come up in discussions, but AMIS won't define that until sometime in the future."
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The Voice Messaging User Interface Forum (VMUIF), a group of RBHC and voice-messaging vendors, is working to establish a common interface. VMUIF has just passed the steering committee phase and will soon begin tackling user-interface standards, so don't expect anything from it soon.

Phyllis Hoffman, Southwestern Bell's product manager for voice-messaging services and a VMUIF member, states, "We're trying to define features that are core [as well as] design principles for other functions. We want to come up with a generic interface for all users, but I want to emphasize that everything's still under discussion."

Integrating voice-messaging and electronic mail services is a facility many vendors say they're looking at, but few have actually accomplished. Most of the products in the accompanying chart that implement such integration do it by setting a flag to notify voice mail and E-mail boxholders that messages are waiting.

Voice-messaging systems represent some of the best bargains available for increasing employee productivity. Instead of playing telephone tag, callers can leave a detailed message relating to the nature of the call, the type of information or action desired and the time and place where they can be reached. Of course, the same could be accomplished by someone taking a message, but frequently such messages are incomplete, confused or not passed along at all.

Using voice messaging for transaction processing is a notable development. The ability to get the status of an order or enter a new one without user interaction speeds the overall operation and eliminates the chances of an employee making a mistake.

> "We want to come up with a generic interface for all users."
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The automated operator is another key feature. Aside from off-loading routine calls from the live operator, the prompts permit callers to reach the desired party in a fairly efficient manner.

The big complaint with prompts, as was pointed out, is that they differ among systems; therefore, callers have to wait for instructions before taking action. For example, to reach an operator on some systems, callers press the zero key on their phones at any time during the announcement. Other systems require that they press the star or pound keys, or wait for the announcement and other instructions to end before the operator comes on. This can lead to a high frustration level.

The VMUIF is working to remedy that by furnishing a common user interface, but its success depends on the level of cooperation the forum receives from equipment vendors. It will probably be easy to get standards for primary functions like pressing zero for the operator, but it's another matter to standardize on all functions available to boxholders.

Hoffman knows that standards won't be easy but she's optimistic. "I believe functional standards can be agreed upon, but it won't happen overnight," she says.

Another source of frustration is the inability to network disparate voice-messaging systems. Those involved with AMIS have vowed to find a solution, and some elementary connectivity recommendations are forthcoming. However, there are a lot of tough problems yet to be resolved.

For example, many voice-messaging systems are written to interface with a specific PBX. The signaling required to perform functions such as playing a personal greeting if the called party is unavailable

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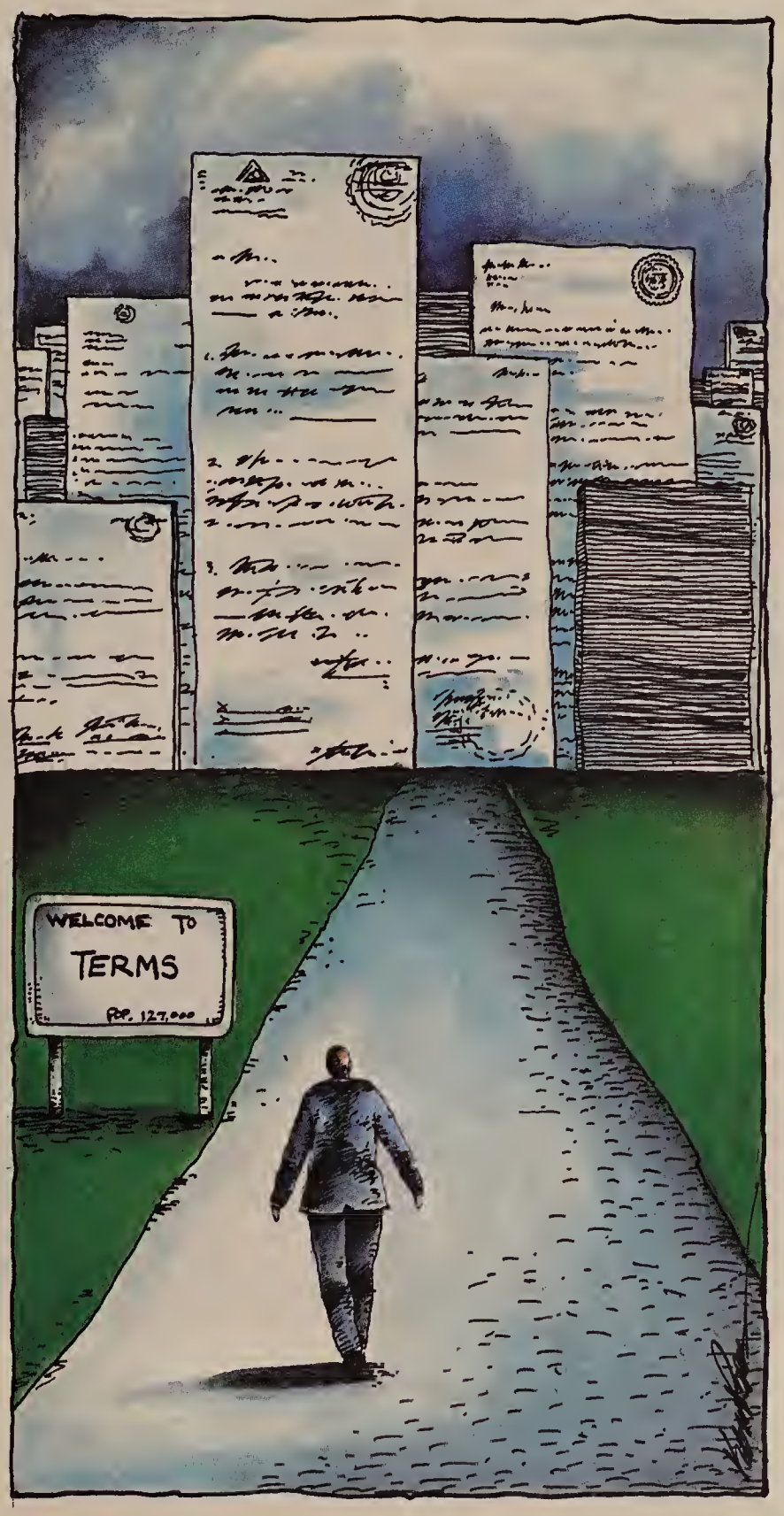
Coming to terms

By RAY HORAK and LILLIAN GOLENIEWSKI

Establishing a good relationship with the vendor of your telemanagement or net management software can be crucial to the smooth operation of your network. The right software systems can provide communications managers with information that has been filtered, sorted, organized and analyzed without overwhelming them with data on the range of intelligent network components.

But software is not without its pitfalls. Even software provided by the most creative and committed vendor will have its weaknesses. Further, the user's relationship with a software vendor involves a long-term commitment of substantial cost — for example, software licensing, data gathering and entry, maintenance and training. The development of a constructive relationship with providers of such intangible products in dynamic environments places a substantial responsibility on the buyer — it pays to do your homework.



Start with the contract

To ensure a harmonious relationship with software vendors, users should set the tone for contract negotiations by clearly identifying all major requirements and contractual issues as soon as possible — in the request for proposal. Well-designed RFPs not only weed out the weaker vendors and provide essential information, but also define the level of expectations for both parties.

Test and acceptance periods should be long enough to ensure that all software elements, and the system as a whole, perform as defined. Test and acceptance time periods should apply to individual software modules, the entire integrated system, the operating platform — if the system is provided on a turnkey basis — and any customized system elements.

Further, the process of setting up test and acceptance procedures should be the same for the initial installation, program trouble fixes or corrections of bugs, enhanced releases or versions, rate and tariff updates, vertical and horizontal (V&H) coordinate updates and so forth.

Users should emphasize that they expect to license a system, not a set of unrelated software and hardware components. The test and acceptance periods should then be long enough to allow proper evaluation of the effect new releases and program trouble fixes will have on the entire system.

Additionally, the performance of system modules, such as trouble management and inventory management, should then be tested. Users should tell the vendor immediately about any degradation in the performance of those modules, any related modules or the interaction among them. They should hold the vendor responsible for the rapid res-

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Horak is executive vice-president and Goleniewski is president of The Lido Organization, Inc., a Mill Valley, Calif.-based independent consulting and training firm specializing in telecommunications network management.

Building a harmonious and productive long-term relationship with your software vendor begins in the RFP stage.

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olution of such problems, which should be handled according to contractually defined performance criteria, formal notification procedures and resolution times.

One additional important point: System warranties are typically for 90 days to one year but can be negotiated. That warranty period should not begin until the system has been fully tested and accepted.

Add-ons

Users should keep in mind that functional enhancements may be added or licensed after the software system is deployed. The user should take care to provide in the RFP and contract for the test and acceptance of such subsequently licensed software. Again, the entire system should be subjected to compatibility and performance testing. Unfortunately, users often find that subsequently installed system modules are of a different — and incompatible — release than the installed system.

The pricing policies of many software vendors are much the same as those of hardware vendors — postcutover software additions are priced at a substantial premium. Careful contract negotiation can reduce or eliminate this price distinction. Users must remember that they are virtually wed to the vendor; no one else can provide them with fully compatible software or support.

Carrying on

Portability means the software can be transported to another host computing system. Some vendors support, on a standard basis, the same source code across multiple hosts. Telco Research Corp., Telecommunications Software, Inc. and Comsoft Management Systems, Inc. are notable in this regard. Portability is a function of the software programming language used; COBOL has limited portability characteristics, while many fourth-generation languages such as Informix are highly flexible.

It pays to anticipate the requirement for, and to negotiate the cost of, transporting software. For instance, within just a few years, relatively simple telemanagement software designed to price calls for one company site and operating on a personal computer may increase considerably in functionality and be used to manage many sites and network components that currently require the processing speed and memory of a minicomputer. Special consideration should be given to vendors that can accommodate such requirements.

Pricing can be an issue here, as well. Vendors typically price software in direct relationship to the complexity and processing capability of the host computer — mainframe software is more expensive than minicomputer software, which is more expensive than microcomputer software. A little forethought here can pay big dividends later.

Don't neglect training

Training and documentation are critical to the successful implementation and operation of an interactive software system. Unfortunately, they are often undervalued and, therefore, neglected elements of contract negotiation. Computer operators and system administrators are key to the performance of mainframe, minicomputer and local network software and require intensive training by the vendor. The cost should be included in the software license and installation.

Users should be categorized by the nature, frequency and intensity of system interaction, and their training should, similarly, be included. Criteria should be established for the completion of successful training. Costs should be established for subsequent training due to turnover and new hires; training on new software releases and program trouble fixes should be included in annual maintenance charges.

> Users must remember that they are virtually wed to the vendor.
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Since it is absolutely vital to successful system use, documentation should be carefully reviewed during the vendor selection process. Current standard documentation should be established as the benchmark against which future releases, additional modules and program trouble fixes are measured.

Similar standards should be established for both standard and customized software and interfaces to network components such as private branch exchanges, modems, T-1 multiplexers and controllers. In the same vein, standards should be established for interfaces to other information systems such as voice mail, E-mail and corporate financial and personnel systems.

In other words, training and documentation standards should be established for the system as proposed and configured.

Carrier coverage

Rate and tariff support can vary widely. At a minimum, the selected vendor should support the published tariffs of the local exchange carriers and the top three common carriers — AT&T, MCI Communications Corp. and US Sprint Communications Co. The vendor should also provide the capability to surcharge and discount tariffed call costs to support nontariffed offerings, offerings of other carriers using one of the three as a benchmark and various resale scenarios. Software also varies widely in its ability to accommodate private network

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Telecommuting on the ISDN highway

By BILL BUFFAM

"Telecommuting" is the term coined to describe working at home while being linked electronically to the office. Much has been written about its socio-economic benefits, risks and costs.

Despite its broad and seductive appeal, telecommuting has yet to find more than niche acceptance. Why is this? After all, the technology needed to make it happen has already been developed.

The kinds of jobs in which telecommuting has been most successful involve tasks that can easily be carried out remotely, using technology that is already widely deployed. The customer service representative and catalog order taker are paradigms. These jobs require only a terminal and a telephone at the employee's home, and a mainframe computer and automatic call distributor (ACD) at the employer's location. The employer must physically move the terminal to the employee's home, connect it to the mainframe with a voice-grade line and teach the company's ACD to call the employee's home phone.

Most professionals and managers need access to a more complex array of resources; consequently, telecommuting is less attractive to them. Typically, their jobs involve five key elements:

- Talking on the telephone.
- Using a terminal — or a personal computer masquerading as a terminal — to interact with a mainframe computer.
- Producing, processing or referring to printed material.
- Using a personal computer or workstation, either stand-alone or, increasingly, on a local net.
- Talking with one or more people face-to-face.

Telecommuting obstacles

The last three elements represent barriers to telecommuting, not because appropriate technologies have not been developed — they have, in every case — but because these technologies have not yet been deployed at the necessary critical mass. Achieving critical mass is vital; think how useless phones would be if only a handful of people had them.

(continued on page 66)

Buffam is a networking consultant with the Complex Systems Integration Division of Unisys Corp. in Malvern, Pa.

ISDN can be instrumental in shaping the "virtual office" of the future.

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The first telecommuting obstacle, dealing with printed material, is a formidable one. Most professionals and managers who have ever tried to work at home have quickly found their progress hampered by the need to look at *this* memo or *that* manual — both of which are back at the office.

This problem cannot be solved overnight. What's needed is an enterprisewide commitment to get all internal memos and documents into a common machine-readable format so employees can call up documents on their personal computers regardless of geographic location. Electronic mail is already pushing us down this path, albeit in a rather ad hoc way. Facsimile technology and the availability of personal computer fax boards and scanners are also taking us in this direction.

Electronic documents

Achieving uniform electronic documentation involves two separate efforts: establishing document standards and implementing procedural measures to ensure conformance, and converting old hard-copy documents into electronic ones.

Although old documents could simply be allowed to die of old age during the migration period, the hard copy conversion problem has to be solved anyway to deal with externally produced documents.

Many publications originating outside the company — for example, brochures, catalogs, manuals, periodicals, reference material and textbooks — will not be available in machine-readable form. How an organization treats these documents will depend on their level of use within the enterprise.

Frequently referenced documents can be scanned into the system using imaging technology. Documents that will be used extensively can be converted to text using optical character recognition. Documents of narrow interest can be scanned into a personal computer on an as-needed basis by whomever needs them.

Clearly, all of this has interesting copyright implications for lawyers and accountants to solve. Equally interesting are the security implications. Internal security measures are needed to ensure that only authorized personnel have access to data. More importantly, competitors must be kept from penetrating the system.

Investing in the future

On the face of it, dealing with printed documents electronically appears expensive. However, it represents an up-front investment to reduce the cost of all future document handling. Once scanned and safely stored, the paper original may be discarded. A document stored on magnetic or optical disk takes up minimal physical storage space and only one copy need be maintained, since the system provides concurrent read access to any number of users.

Having the document, with its associated indexes, in machine-readable form makes retrieval much easier and faster, and reduces the likelihood that it will be misfiled and lost. Computer-based text-searching operations make life easier when you're trying to find some subject but don't know where to look. When you add up all of the benefits, investment in the initial scanning and storage of a document pays off handsomely over its life span.

What's so fascinating about this whole scenario is that each enterprise that invests in such a document-handling system becomes part of a growing mass of participants.

As soon as critical mass is achieved, companies will be forced to produce their documents in machine-readable form, just as companies today are being forced by competitive pressures to implement electronic data interchange for purchasing and invoicing.

Furthermore, the attainment of critical mass will trigger the formation of services to convert the world's vast bulk of existing printed matter into machine-readable form accessible by anyone willing to pay the price.

Achieving critical mass

A situation will exist in which many enterprises will have implemented automated documentation repositories and handling systems. Their employees will use the personal computers and workstations on their desks to perform many of the

> Internal security measures are needed to ensure that only authorized personnel have access to data.
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> Frequently referenced documents can be scanned into the system.
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tasks that today require hard copy. Equipped with a personal printer and a small number of frequently referenced, hard-copy documents, professional workers will use personal computers for the bulk of document processing.

With the personal computer as the primary window on documents of all kinds, all we need to make telecommuting viable is to move the personal computer to the home and connect it electronically to the office.

The overriding problem, however, is one of available transmission speed. Document transmission, particularly involving image and graphics, is very bandwidth-intensive. Even without considering documents, a local networked personal computer using server-based files or data bases presents a much heavier communications load than traditional terminal-to-mainframe applications.

To solve the long-haul high-speed communications problem, we have Integrated Services Digital Networks, a handy technology already waiting in the wings. Long in gestation, ISDN has received at least as much negative publicity as positive.

Opinions often expressed are, "ISDN is a solution in search of a problem," "We already have T-1, thank you," and "Who needs this already obsolescent gimmick being foisted on us by the carriers anyway?" While the relative merits of T-1 vs. ISDN for business communications are indeed arguable, ISDN wins by a knockout when considered for telecommuting.

> While the relative merits of T-1 vs. ISDN are indeed arguable, ISDN wins by a knockout for telecommuting.
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In technology terms, ISDN is nothing more than value-added T-1. The raw data rate of 1.544M bit/sec is the same. What differentiates ISDN is that the bandwidth is structured in a way that the carrier understands. Part of this bandwidth is used to exchange control messages between the subscribers and the carrier — called signaling in telephony parlance — and herein lies the added value. One of the uses of the signaling channel is to perform switching (otherwise known as dialing) on the bearer (data or voice) channels.

BRI and PRI

ISDN provides two important interfaces: the Basic Rate Interface and the Primary Rate Interface. The Basic Rate Interface is intended for homes and small businesses, and provides two digital bearer (or B) channels running at 64K bit/sec, together with a 16K bit/sec signaling (or D) channel. With this 2B+D makeup, the Basic Rate Interface is used to support telephones and data terminals.

The Primary Rate Interface is intended for larger customers and terminates in a private branch exchange, a multiplexer or a data communications processor. The Primary Rate Interface provides 23B+D (in the U.S., Canada and Japan) or 30B+D (elsewhere), with the D channel running at 64K bit/sec.

The ability to switch sets ISDN apart from T-1 and fractional T-1, and makes it viable for home use, which T-1 is not. The difference between T-1 and ISDN is analogous to the difference between trains and cars. Trains go where the carrier decides, or where whoever has the resources to charter a train decides. Cars, like ISDN, are economical enough for ordinary people to buy and can be made to go anywhere their owners desire.

Potential problems

At first sight, ISDN, with its two data channels of 64K bit/sec, still seems an order of magnitude too slow for successful telecommuting, compared with an office local network running at several megabits per second. But consider a group of 20 to 50 personal computers on an Ethernet local net running at 10M bit/sec and keep in mind that Ethernet is inherently half-duplex.

Following the conventional wisdom that local nets that have carrier-sense multiple access with collision detection should be kept below 30% utilization — especially with more than a few stations — the bandwidth available to each station is comparable to that provided by an inherently full-duplex, point-to-point ISDN connection. Throughput, therefore, does not appear to be a problem.

Response time, however, is another matter. The most bandwidth-intensive data traveling to the personal computer will be high-resolution graphics. At 64K bit/sec, a screenful of high-resolution graphics can be shipped in under 10 seconds using Group IV fax compression techniques.

For most applications, high-resolution graphics will be unnecessary, and response time will be correspondingly better. Users will probably find a response time of 10 seconds acceptable, but only if they understand that it's necessary because of the complexity of the data. Otherwise, the Open Systems Interconnection network layer can use ISDN Basic Rate Interface connections to attain speeds in excess of 64K bit/sec by using both B chan-

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See The Faxnet Form On Page #79.

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MOTOROLA

"I DIDN'T CODEX D

See The Faxinet Form On Page #79.

(continued from page 67)
nels in tandem for an effective rate of 128K bit/sec.

In the extreme, two phone lines can be used to provide an effective full-duplex bandwidth of 256K bit/sec. (It is standard telephone company and building practice to install at least two wire pairs in all homes, while only one pair is needed for each phone or ISDN line.)

A capacity of 256K bit/sec should be sufficient until ISDN is upgraded — a process for which there is developed technology and increasing political pressure.

Reverse telecommuting

What this effectively means is that a personal computer or workstation located at home can, courtesy of ISDN, become a member of a local network. If all members of this work group become telecommuters, the office local net almost disappears, leaving only a small number of pooled personal computers for occasional visits to the office.

Essentially, the office local network mutates to a telecommuting wide-area network. The home becomes the principal workplace, with visits to the office only occasional events. On such an occasional visit, the telecommuter can use one of the pooled office personal computers to access files residing on the home personal computer.

> A personal computer located at home can, courtesy of ISDN, become a member of a local network.
>
> ▲▲▲

Whether we look at straightforward telecommuting or reverse telecommuting, an interesting shift has occurred: The personal computers and their servers are now running wide-area network protocols as well as, or instead of, local network protocols.

Another key difference is that personal computers on the network now need access to the files of other networked personal computers, not just to those of the server. This implies a capability not ordinarily present in today's local net software.

Face-to-face

Putting all these pieces together, we can see that the telecommuter working at home needs a telephone, a personal computer, a graphics printer, a fax board and scanner, and ISDN access to the office system holding or affording access to on-line document repositories. With such an arrangement, the first four of the five key elements of the professional or managerial job can easily be performed at home.

The third and final remaining obstacle to telecommuting, face-to-face interaction, is the most problematic. Brainstorming around a white board is difficult to do without having all participants physically in the same room. Ad hoc meetings to resolve unclear situations are not well suited to audio teleconferencing, and neither is any kind of personal interaction where reading of body language is important.

Videoconferencing technology will take some time to reach the price and feature levels at which home installation becomes attractive. A high-bandwidth ISDN will almost certainly be needed for home videoconferencing, advances in video compression techniques notwithstanding. For the time being, some amount of travel to the office seems inevitable, purely because of these technological considerations.

ISDN can become the telecommuting highway, with personal computers, workstations, servers, mainframes, faxes and telephones the telecommuting vehicles.

Letters

continued from page 47

(that is, it supports independent logical units and possibly dependent logical units).

For the readers' benefit, let's further examine some of the information carried in the XID Type 3 that is critical to understanding the interaction between the physical unit and the NCP.

When a PU 2.1-capable physi-

cal unit is being activated, it is the presence of the ACTPU suppression indicator (byte 9, bit 0, set to 0), along with the presence of the Network Name Control Vector — Control Point Name (Control Vector 'OE' Type 'F4'), that informs the NCP how the PU 2.1 node will assign independent logical unit and dependent logical unit addresses. Of course, the address space managers of the 2.1 nodes must abide by the addressing rules negotiated at activation time.

My point is this: The information required to understand how PU 2.1 nodes work is available from IBM and is written clearly and concisely. High-level overview information on IBM's PU 2.1 support can be found in the IBM publications "VTAM V3R2 and NCP V4R3/V5R2 Installation Considerations" and "A Technical Overview: VTAM Version 3 Release 2, NCP Version 4 Release 3, NCP Version 5 Release 2."

For more detailed information, the reader is directed to IBM's "SNA Type 2.1 Node Reference" manual.

Mr. Mohen can contact me regarding the transfer of the beer.

Joseph Rumolo
SNA consultant
Computer Networking Resources, Inc.
Highlands, N.J.

Author's response: While Mr. Rumolo's research is admirable, his answers are wrong. First of all, the receipt of an XID-3 does not necessarily mean that the Network Control Program will treat the node as Type 2.1.

For example, Eicon Technology Corp.'s Sun 386i Advanced Program-to-Program Communications product sends XID-3 when operating as a PU 2.0 node, as do several IBM products.

Second, the ACTPU suppression bit is not what tells NCP that the node is Type 2.1; there are Type 2.1 nodes that set this bit either way (such as the Application System/400), and its principal use in this context is to define how alerts will be sent to NetView, not to indicate the physical unit type.

Third, the presence of the Control Point Name vector does not indicate whether the node is Type 2.1 or not; some 2.1 node implementations (such as APPC/PC) do not send that vector at all.

It would be nice to take all IBM documentation at face value and blissfully go through life. We might even get away with this if all computers were blue.

Yet it does become necessary to delve into the finer points of PU 2.1 when computing environments are heterogeneous (as most are today), and we should occasionally take what we read in a manual with a healthy dose of skepticism.

Sorry, but as far as I'm concerned, Mr. Rumolo hasn't earned his beer.

Joe Mohen
SNA consultant
New York

Consultant gives kudos

I am unable to enter your Fifth Annual User Excellence Awards contest because the questions on the entry are not applicable, based on the type of work I'm involved in — voice/data consulting and project implementation.

I do find your publication extremely informative and think your staff does a superb job of keeping us informed of the goings-on in the telecommunications industry.

Richard Gemmell
Consultant
RJG Associates
Seattle

Good intentions

The letter concerning the gender/humor gap (*NW,* Aug. 28) struck a responsive chord in me. I have a responsible position with du Pont but often feel the effects of the culture concerning my job responsibilities.

The most recent disappointment was the most devastating for me. My daughter graduated in the top of her class as a dentist, passed the board, and yet the two dentists for whom she has been working have her cleaning teeth — a job usually done by the hygienist.

While your cartoon did not condone inequality, I'm afraid that many people will read it that way. Nevertheless, I appreciate your intentions.

Marlys Denison
Senior systems specialist
E.I. du Pont de Nemours & Co., Inc.
Orange, Texas

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Our new TS2 diskless workstation is made to deliver customer satisfaction.

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"Press ? for more options . . ."

By TOM FERMAZIN

Standards are not a new concept to the voice-messaging industry. For more than a year, a dedicated group of users and vendors has been actively developing the Audio Messaging Interchange Specifications (AMIS) standard, which will allow one manufacturer's voice-messaging system to network with or send messages to another manufacturer's system.

In June, a new group, the Voice-Messaging User Interface Forum (VMUIF), met for the first time to begin developing standards for the user interface — the set of user inputs for accessing or activating various features and functions of voice-messaging systems.

The group, which includes representatives from regional Bell holding companies, voice-messaging manufacturers, independent telephone companies and voice-messaging service bureaus, has agreed to meet monthly to expedite the standards development process. A standard could be ready as early as the end of the year.

Phyllis Hoffman, project manager for voice-messaging services with Southwestern Bell Telephone Co. in St. Louis, who is involved with both AMIS and VMUIF, says she feels strongly about the timeliness of the user interface effort.

"Most of the regional Bells have voice-messaging trials going on," she notes. "It's important to define standards as soon as possible so new users can begin with a common set of user interfaces. We need to get the standards process under way — to put a stake in the ground, so to speak."

Is another standard needed?

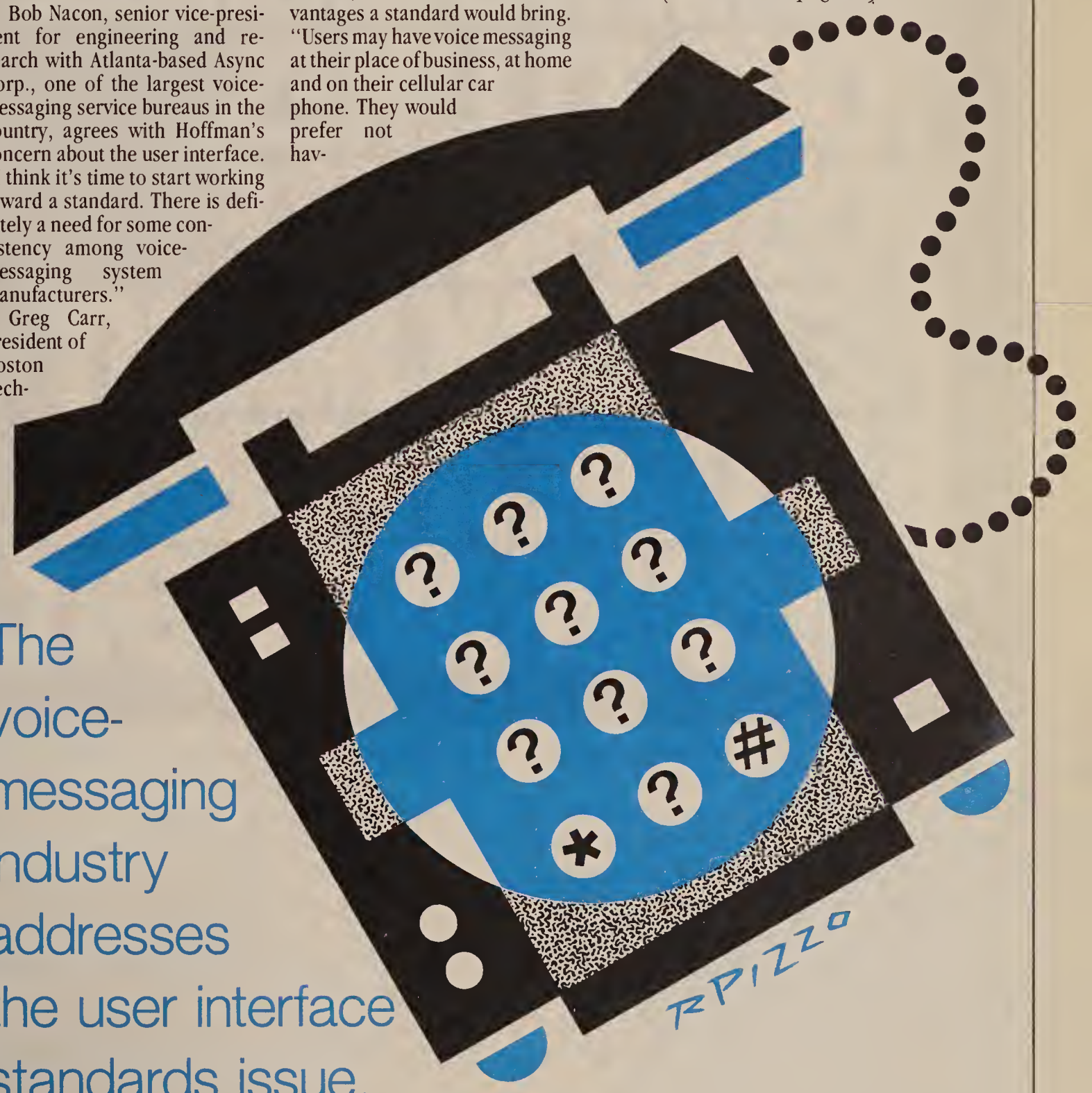
Bob Nacon, senior vice-president for engineering and research with Atlanta-based Async Corp., one of the largest voice-messaging service bureaus in the country, agrees with Hoffman's concern about the user interface. "I think it's time to start working toward a standard. There is definitely a need for some consistency among voice-messaging system manufacturers."

Greg Carr, president of Boston Technology, Inc., a Boston-based voice-messaging manufacturer actively pursuing the telephone company and service provider market, sees the obvious user advantages a standard would bring. "Users may have voice messaging at their place of business, at home and on their cellular car phone. They would prefer not having to learn three different sets of operating instructions," he saay.

This scenario is not unrealistic. Acceptance of voice messag-

(continued on page 74)

The voice-messaging industry addresses the user interface standards issue.



Fermazin is a senior telecommunications analyst with Amoco Corp. in Chicago.

(continued from page 73)
ing in the business world is widespread. Voice messaging for cellular service is no longer unusual, and most Bell operating companies are gearing up for general introduction of residential voice-messaging services.

Where's the beep?

VMUIF members agree on the need for a standard. But the big question may be what to include in the standard. Greg Hawkins, director of marketing for voice-messaging manufacturer Digital Sound Corp. in Santa Barbara, Calif., sees a two-tier standard being adopted.

"There will be a core of basic interface commands," Hawkins says.

"In addition, there would be standards covering prompts, such as a beep to indicate when the caller should begin leaving a message. But there will always be features not offered by all manufacturers, or perhaps only offered to businesses but not residential subscribers. It would not be practical to include all of these in a standard."

> Attempting to define a broad range of commands would significantly delay standards development.
>
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Hoffman says three or four interface commands would be a workable initial core that vendors could expand as the needs of users evolve. "Attempting to define a broad range of commands would significantly delay the standards development process and reduce the likelihood of acceptance by manufacturers and service providers," she says.

What about users?

While manufacturers and service providers are well-represented among the VMUIF membership, user organizations are conspicuously absent. Has user involvement been discouraged or are users just not interested in developing a user interface? Are the benefits of a user interface apparent only to manufacturers and service providers?

Dave Weinstein, director of marketing for Centigram Corp. of San Jose, Calif., says he believes user noninvolvement is only temporary. "The group has only recently gotten together," he points out. "Users will become involved in time."

When AMIS participants representing large voice-messaging user organizations such as Eastman Kodak Co., General Electric Co., Johnson & Johnson and The Coca-Cola Co. were contacted recently, it was apparent that the user interface standard was lower on the list of priorities than the voice-messaging system networking standard.

When asked if adherence to a user interface standard was likely to become a prerequisite for future purchases of voice-messaging systems and services by their firms, all responded no or probably not.

When asked if they would consider retrofitting their existing voice-messaging systems to meet a user interface standard if the vendor provided necessary software or hardware at little or no cost, all emphatically said no.

> "Retraining for the sake of complying with a new user interface standard would be hard to sell to our subscribers."
>
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Finally, when asked if they would be willing to pay a premium for a user interface standard-compatible system, all but one answered not likely.

All, however, said they sincerely believe that a voice-messaging user interface standard is not only a good idea, but a natural and inevitable occurrence.

According to AMIS group participant Jerry King, manager of telecommunications applications at General Electric Co. in Bridgeport, Conn., "I'm more concerned with getting [GE's] voice-messaging systems networked together. AMIS is important to us. The user standards, on the other hand, don't easily translate into hard dollar savings. If we adopt the user interface standards, we would be faced with retraining all our users."

Most of the AMIS members queried mentioned the prospects of having to retrain users as one of the biggest reasons for not converting to any new standard that may be devised.

Async's Nacon hints that there might be a more acceptable way for service providers and user organizations to adopt new standards. "Retraining for the sake of complying with a new user interface standard would be expensive and hard to sell to many of our subscribers," he says. "However, if manufacturers made the new standards available on a class-of-service basis, there would be more interest."

(continued on page 78)

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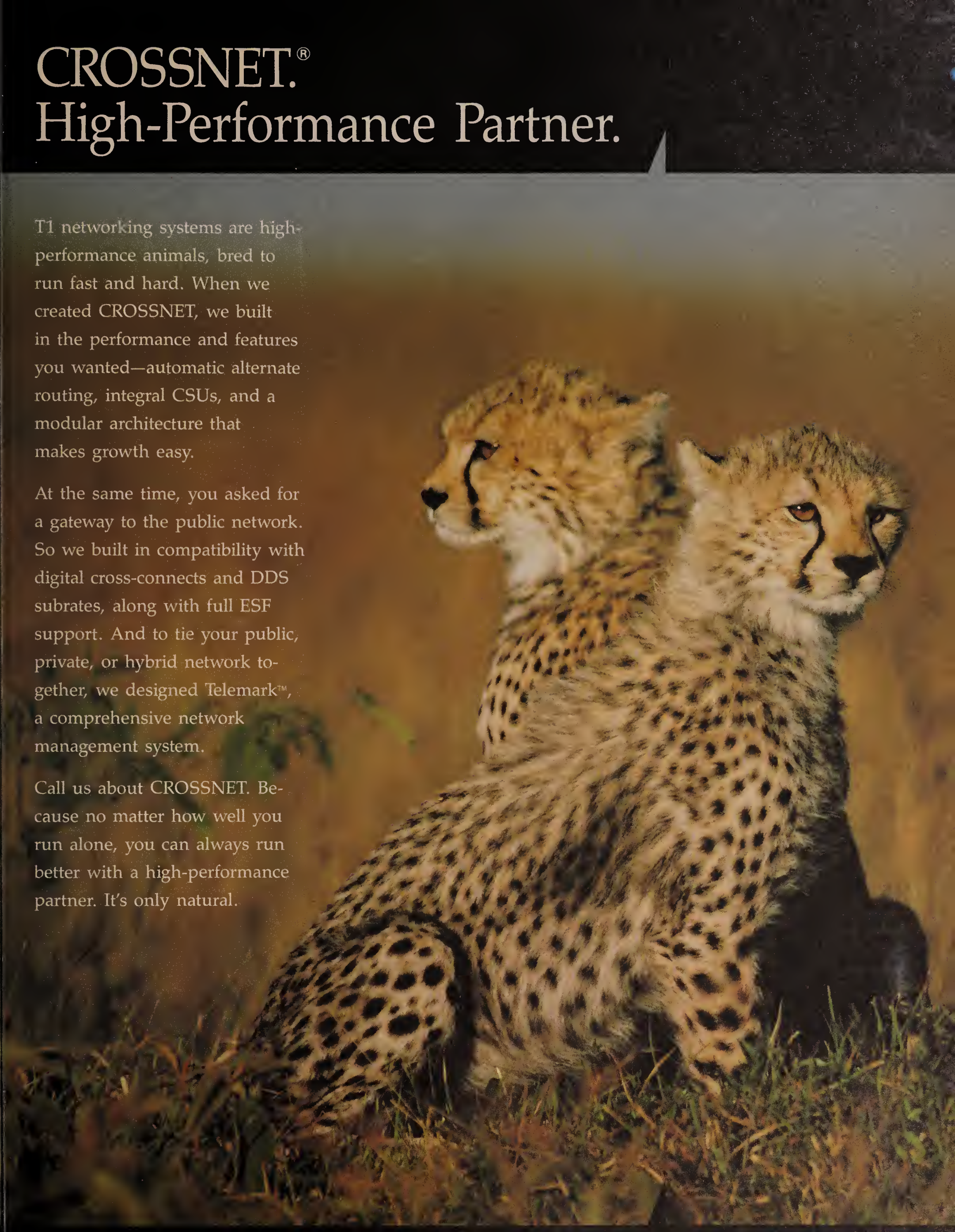

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AT&T Computers have Burlington Northern Railroad customers raving about service.

Denver, Colorado
May 2, 1989

The Burlington Northern National TrackSmart® Center is getting rave reviews from its customers. And AT&T's distributed networked computer solution behind it is getting rave reviews from Burlington Northern. Burlington Northern's Lonnie Jarrell tells AT&T's Chris Turnquist why AT&T Computers provide a better way to serve customers of the longest railroad in the country.

Lonnie: We want to be known for superior customer service. So we planned proactive shipment monitoring through a new customer service concept—the National TrackSmart Center.

Chris: And better customer service means getting information to your customers, in *their* reporting format, as soon as your reps have it.

Lonnie: Exactly. All we had to do was listen to our customers to understand their transportation information needs. That was plenty of inspiration. We knew then that we needed a system that would let our reps instantly locate cars and report shipment status to customers immediately.

Chris: I remember when your reps could only handle one customer at a time. They had to query the mainframe database car by car. And *then* manually record their findings and send them out. Now each rep can handle up to ten customers, right?

Lonnie: Absolutely, plus the rep has more time to serve his customers better. Now they save time by tracking every car from *one* CRT. The AT&T 6500 Multifunction Communications System gives them multi-window access to two synchronous sessions on our host, as well as async access to the TrackSmart application and AT&T Mail. Both TrackSmart and AT&T Mail run concurrently on the AT&T 3B2/1000 Computer. So the reps get information the second they need it.

Chris: And you're able to tap information easily.

Lonnie: Right. Because you molded AT&T distributed networked computing to fit the Burlington Northern, rather than the other way around. You provide it all—computer networking systems and communications expertise. Plus you blend it all together with other systems better than any company I've ever seen.

Chris: I understand one customer wrote a BN rep promising him an official company ID naming him their Assistant Transportation Manager.

Lonnie: That's true. But you know, if we're going to be a partner to our customers, we have to be a partner with vendors who can take us in that direction.

The Burlington Northern Computer Solution

THE CHALLENGE:

Differentiate Burlington Northern as a superior provider of customer service.

THE SOLUTION:

A distributed networked computer solution integrating Burlington Northern's applications with a UNIX® System V-based Informix® 4GL database management package. An AT&T 3B2/1000 Computer is the gateway to the host for TrackSmart information. The AT&T 6500 Multifunction Communications System provides host access with four window functions appearing on AT&T 6539 displays. AT&T Mail sets up an E-mail link between reps and customers; AT&T Mail with Private Message Exchange/TERM is a private E-mail link between Burlington Northern reps and TrackSmart.

THE RESULTS:

The system increases the number of customers a representative services tenfold. Some customers have indicated TrackSmart saves them at least four hours daily.

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(continued from page 74)

Nacon is referring to the ability of voice-messaging systems to support multiple sets of user interfaces. Existing subscribers could retain their current set of interface commands and prompts, while new subscribers added to the same voice-messaging system could use the VMUIF standard-compatible user interface. No retraining would be required, unless some current subscribers chose to convert to the new standards. This could be handled on a subscriber-by-subscriber basis.

Is there a user in the house?

Despite the obvious absence of users at VMUIF meetings to date, they are being represented in a somewhat unique way. Invited to attend the July meeting was the Alliance for Public Technology (APT), a nonprofit organization based in Washington, D.C. The APT is a coalition of 38 organizations and interested individuals who share a common goal of consumer advocacy in communications, information technology and services.

APT's executive director, Kathie Klass, enumerates some of the group's goals. "Our membership includes organizations representing the disabled, minorities such as Hispanics and Chinese, and several colleges. It's our objective to see that communications technology is made available to the entire population, not just part of it," she explains.

"There is a risk that products and services will be designed and priced only for the business or upper-income professional market," Klass continues. "We would like to see audiotex gateways used for dispensing public information — perhaps disaster-related messages after a flood or fire. We are concerned about barriers due to language or physical disabilities that prevent some individuals from accessing enhanced services provided by telephone companies."

> "It's our objective to see that communications is made available to the entire population," Klass says.
>
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Southwestern Bell's Hoffman echoes this theme. "The RBHCs have a resspnsibility to meet the needs of all our potential subscribers. We also need to make sure that everyone has access to our services," she says.

Hoffman is referring to statistics reported in the October 1986 issue of the *Journal of Quality Progress*. The article stated that more than 27 million adults in this country are considered functionally literate and another 35 million are marginally literate. "When we develop enhanced calling services," Hoffman says, "we need to ensure that the user interface doesn't become too complicated or too technical for a large part of the public to use."

Digital Sound's Hawkins has also addressed this problem. "We have worked very closely with Pacific Telesis [Group] to develop a user interface for the residential market — particularly in Southern California, where there is a large population of Spanish-speaking subscribers," he says. "Any system that PacTel installs must cope with this potential language problem. We now have bilingual voice-messaging capabilities."

> "We have worked closely with Pacific Telesis to develop a user interface for the residential market."
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One of the decisions tth VMUIF will have to make is whether to use mnemonic commands — for example, press D to delete — or numeric commands. Differences in language may eliminate the viability of the mnemonic codes.

How long must we wait?

When will the VMUIF standard be universally adopted by RBHCs, independent telephone companies, service bureaus and customer premisesgquipment voice-messaging manufacturers? The bandwagon may start to roll as soon as the end of the year or the first quarter of next year, when the VMUIF group hopes to release the draft standards to vendors for comments.

But when everyone will climb aboard depends on who you talk to. Most of the industry and user representatives interviewed Nfr this article say that three or four years for general acceptance is too long. None thought that compliance would reach critical mass by the end of next year.

As with any standards-setting body run by committee, there is no way to accurately predict the eventual outcome. But one thing is certain: A voice-messaging user interface standard will be developed soon. Telephone companies, service bureaus, voice-messaging manufacturers and, yes, even users are betting that one day one standard will be adopted by all.

See The Faxnet Form On Page #79.

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Listed below in the FAXNeT Directory are the FAX numbers of all advertisements in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

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- ☐ Within One Year

Scope of Purchase Responsibility
- ☐ Enterprise Wide
- ☐ Departmental

Purchase Influence/Number of Sites
- ☐ One Site
- ☐ 2-9 Sites
- ☐ 10-20 Sites
- ☐ 21+ Sites

Product Advertised: _____

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_____

By word of mouth

continued from page 62

and activating the message-waiting indicator vary with PBXs, and many PBX vendors have not opened those interfaces to third parties.

This might change since Northern Telecom and AT&T have moved to open their interfaces to third-party systems. But don't expect to get the same functionality level when using third-party voice-messaging units.

According to Lisa French, senior associate at Vanguard Communications, "It's likely that the PBX vendors will maintain a higher level of functionality with their voice messaging than they'll permit third-party products to invoke." In the future, PBX vendors may be pressured by users to open their interfaces entirely, however. "Customers are seeing voice messaging as more important, and PBX vendors may be required to fully interface with third-party voice messagers if they wish to get the business from many companies," French says.

It's too early to say if all PBX vendors will comply with that need, but Harry Schwedock, vice-president of business development for AMVOX, a Los Gatos, Calif., voice-messaging service provider, says that problem can be overcome. "If the PBX uses [dual-tone multifrequency] signaling, it's no problem; proprietary signaling will require the [PBX] vendor to modify [the interfaces] or the voice-messaging vendor will have to do reverse-engineering."

That leads to a big question concerning voice messaging and PBX integration. When compiling the data for this Buyer's Guide, *Network World* asked vendors to list the PBXs with which their voice-messaging systems integrate. Many listed 10 or more, which is highly suspect since several PBX vendors — especially those selling voice messaging — have not opened their interfaces.

It could be that some voice-messaging vendors correlate PBX integration with interfacing, but they're not the same. Interfacing does not allow the use of PBX facilities, such as activating the message-waiting light or forwarding unanswered calls to a personal greeting that invites the caller to leave a message or transfer to another extension.

Attempts have been made to develop standards to permit disparate system interoperability, such as Open Systems Interconnection, and vendors go along to a point where they want to retain exclusivity to differentiate their product from those of other vendors. Will AMIS be more successful?

"I believe most of the vendors really want it for the market to grow," says Chris Seelbach, a senior analyst with Probe Research.

Of course, if the carrot doesn't work, there's always the stick. "We won't buy from anyone not conforming [to AMIS], and I know the other RBHCs and many users feel the same way," warns Heidi Harris, director of voice mail products at Pacific Bell in San Ramo, Calif. That sounds like a pretty good incentive.

Coming to terms

continued from page 64

pricing scenarios and banded and virtual WATS.

Most vendors update full V&H and rate tables quarterly, which is usually adequate. Users that find accurate call rating critical to their company should negotiate for more frequent updating to changes in published tariffs.

Also, they should determine the source of the rate and tariff information and secure unconditional rights of usage. While some vendors, such as XTEND Communications Corp. of New York, maintain their own rate and tariff departments, many others rely on rating services such as CCMI/McGraw-Hill and NMI/Network Analysis Center, Inc. Such rating services often fall behind in updating local rate tables and they may not have licensed the vendor to use such information for resale purposes.

Additionally, users may wish to negotiate directly with the rating service — at substantial savings.

License fee structure

Software license fees are two-tiered. Tier 1 is the initial license fee, or first cost. The initial fee is essentially the purchase price, although the software is typically not for users to keep unless they purchase the source code to the software, as proposed and configured, and the rights to modify it.

More commonly, software is rented, requiring mandatory annual license, or right-to-use, fees. Such Tier 2 fees are typically 8% to 15% of the first cost, although price escalators based on the Consumer Price Index or Wholesale Price Index may affect the annual fee in subsequent years. Once again, a little homework can pay off.

Although they can be negotiated, annual license fees are payable in advance and are triggered by the warranty expiration.

Annual maintenance

Besides the right to usage, the benefits of annual maintenance generally include access to new software releases and current documentation, V&H and rate updates and a reasonable level of on-line telephone support.

Although annual fees are typically mandatory, they are expensive, and users should be sure to get their money's worth. They should get contractual assurances about the size of the support staff dedicated to the software product, the level of staff experience and competence they can expect, and the hours during which on-line support is available. Especially in a mainframe environment, much of the batch data processing is done after regular business hours and 24-hour support may be required.

Also worth formalizing are response times and escalation procedures if the vendor's first support level doesn't resolve a failure.

The term of the maintenance agreement is critical but unfortunately often overlooked. For instance, several years ago, the Federal Communications Commission mandated that, to gain FCC certification, PBX vendors must commit to supporting their systems for 10 years.

While the FCC is not likely to similarly protect software purchases, vendors should be willing to commit to supporting the software for some reasonable time period — with associated penalties for failure to do so. Undoubtedly, many users of Digital Equipment Corp.'s PBX Facilities Manager, notorious for its maintenance problems, wish they had negotiated such protection.

> Although they can be negotiated, annual license fees are payable in advance and are triggered by the expiration of the warranty period.
>
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Software jointly developed by the user and vendor may result from either unique applications requirements or a more universal requirement not previously identified by the vendor.

The standard systems of most software vendors were originally developed as custom software, often with heavy involvement of the client. Subsequently, that software was modified and packaged in a more generic form and remarketed.

Users may be able to retain some level of ownership in jointly developed products and thereby recover the cost of development through future royalties. However, this would depend on the level of the user company's involvement in custom software development and the level of the software's potential for more universal application. Comsoft Management Systems routinely offers such arrangements.

On the other hand, custom software may be difficult to support. Users should seek contractual assurances about the level of training, documentation and on-line support they can expect.

Standard software may not have been developed, in total, by the vendor; substantial elements of it may be the result of an OEM relationship. Many vendors have incorporated traffic optimization software developed by either HTL Telecommunications, Ltd. or Vector Software, Inc.

Users should make sure they have a clearly stated right to use the software, regardless of any subsequent breakdown in the relationship between the vendor and its OEM.

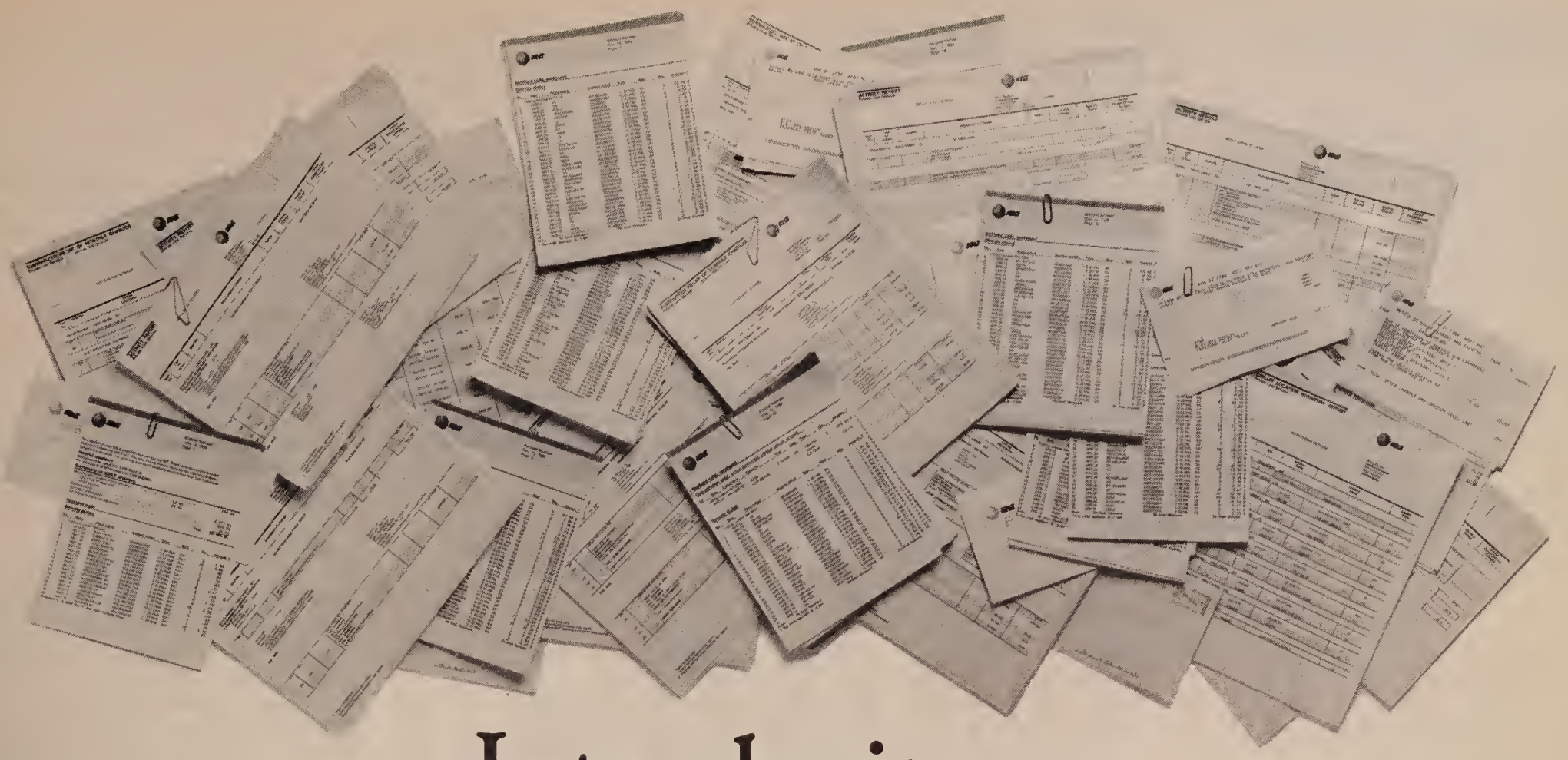
Further, users should recognize the possibility of a major business setback or complete failure for the vendor. The software developer should place a copy of the source code in escrow with the understanding that the user has full rights to claim it in the event that the vendor becomes unable to support the system.

System interfaces are developed to either accept data from or transfer data to another information system, or both. Telemanagement and network management systems accept call detail and system configuration information from PBXs, alarms from intelligent network components such as T-1 multiplexers and controllers, and data base information from corporate personnel and budget systems.

The systems upload configuration and fault correction commands to intelligent network components and files to financial systems; they also communicate purchase orders, work orders and trouble reports to vendors on an electronic basis.

All such standard interfaces should be supported by the contract over time, regardless of

(continued on page 82)



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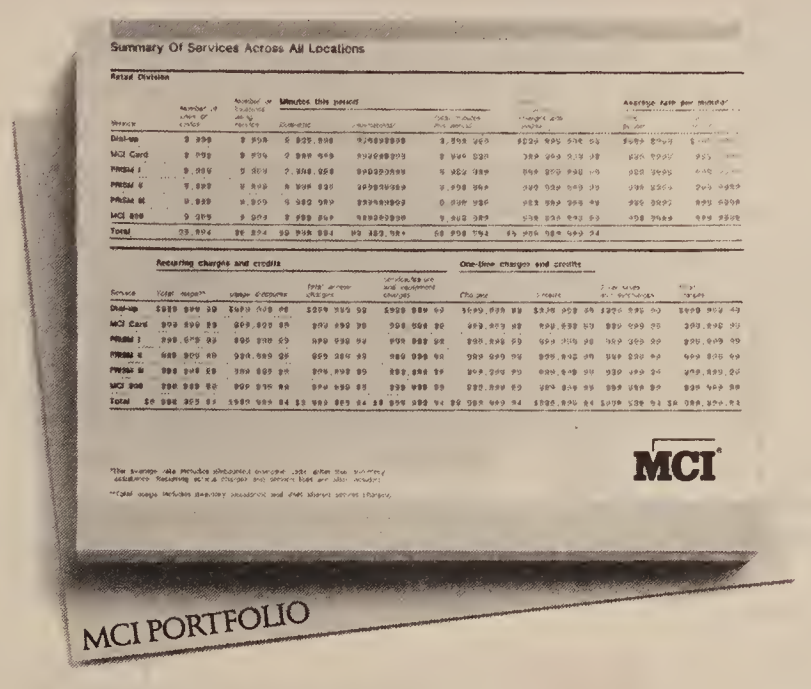

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Coming to terms

continued from page 80

changes made in the system or components at the other end of the interface. A call-accounting system module is of little use if the PBX manufacturer makes changes to the call record format and the telemanagement software vendor is unable or unwilling to support such a change. Network management systems are similarly affected if a T-1 multiplexer or modem manufacturer changes the format of alarm information.

Special risks are involved where reconfiguration or fault correction commands are uploaded to a network component. Unless the hardware and software manufacturers have established a special relationship, such capabilities are usually developed through reverse-engineering or "code busting," a bootleg method of determining the required access protocols and command formats.

Hardware manufacturers clearly frown on such practices and actively discourage them by voiding warranties, changing access protocols and command formats and generally refusing to support devices interfered with in such a manner. At the very least, users should negotiate with their software vendor for contractual assurances that the system will maintain currency with the network component software.

Distributor danger

Buying through distributors can be especially risky. Distributors and agents are by no means wed to software developers any more than they are to equipment manufacturers: Witness the changes in ownership and product lines of Compath, which became Compath National, which became TelPlus, Inc., which was acquired by Siemens AG, which now owns 50% of Rolm.

It is worth noting that Math Corp. of San Francisco recently ended its 16-year relationship with Account-A-Call Corp. of Burbank, Calif., in favor of a similar relationship with Communications Group, Inc. (CGI) of King of Prussia, Pa. Also still at issue is just who owns the Account-A-Call customer base sold through Math and, therefore, whether that base can be migrated to CGI. (In the meantime, the base *has* been largely migrated by Math.)

Determine the extent to which the distributor, as opposed to the developer, will support such things as the system, tariff files and so forth.

Users can protect themselves by gaining contractual assurances from the developer that it will support the system directly — or provide alternative support of similar quality — in the event the distributor fails or becomes either incapable or unwilling to support the system according to the criteria established in the contract. PBX manufacturers have issued such comfort letters for years, albeit reluctantly.

Disaster preparation

A little planning and forethought can pay big dividends in the event of computer failure, fires, floods and other acts of God, man and technology. Data files should be backed up on a regular basis and stored offsite. Programs should also be backed up regularly, and vendors should maintain a duplicate set of software, as proposed and configured — and updated.

Just in case you are not able to recover quickly and completely from a system failure, you may wish to negotiate with your vendor to assume control of your system as a backup measure. With backup copies of your programs and files, the vendor should be able to poll and process your data until you can recover and resume regular operations. There will likely be a premium associated with such peace of mind, but it is well worth it if your data is critical.

> Users should negotiate for assurances that the system will maintain currency with the network component software.
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Penalties and liquidated damages are things that neither you nor your vendor ever wish to calculate, but such provisions will certainly get and maintain your vendor's attention — and make your life a lot easier. Critical areas of measurement include system downtime, vendor response time and the frequency and timing of rate and tariff updates. The timing and frequency of vendor performance evaluation should be carefully considered, and the levels of penalties and damages should be established.

To sum up

Building solid, long-term relationships with telemanagement and network management software vendors is much like building any other relationship: It is critical that both parties develop a common and reasonable level of expectation. The tone for a truly harmonious relationship should be set by the buyer in the RFP, which should be the basis for final contract negotiations. The burden for establishing the terms of a satisfactory relationship rests with buyers. To do so effectively, they must study the application environment, carefully analyze their needs, ask lots of questions of prospective vendors and apply liberal doses of common sense.

One final note of caution: Don't strike *too* hard a bargain. A good contract is fair to both parties. An unprofitable sale may eventually result in less-than-enthusiastic system support and, therefore, unhappiness for the buyer as well.

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See The Faxnet Form On Page #79.

PC ISDN interface supports 64K links

continued from page 4

personal computer to the mainframe, Boyce said.

One early customer of the product plans to use it to give selected users high-speed access to a host for large file transfers and to back up users that require guaranteed mainframe access.

David Isherwood, assistant vice-president at Shearson Lehman Hutton, Inc.'s Information Services Division in New York, said he has finished testing the product and is ready to put it into use supporting a limited number of employees.

According to Boyce, some users may want to use the products to obviate the need for remote cluster controllers. Customers can move controllers back into data centers, making it easier to manage them, and use the BRI card and software to establish 64K bit/sec links with remote microcomputers.

Due to the cost of products necessary to accomplish that — a total of $1,790 — it would only be cost-effective for sites with a small number of personal computers, said Frank Dzubeck, president of the Washington, D.C. consultancy Communications Network Architects, Inc.

Boyce agreed that the BRI card and accompanying software is not intended to replace existing personal computer-to-mainframe products. The products are targeted at users that do not have the mainframe access they want or do not get the performance they need, he said.

Boyce noted that existing applications written for DCP will work with the Basic Rate Interface implementation because the products use the same application program interface (API).

A spokeswoman for Aristacom International, Inc. of Alameda, Calif., another early user of the product, said the applications it developed for DCP were easily ported to the new BRI card. Aristacom sells application hardware and software, based in part on AT&T DCP products, that enable users to support voice and data over a single link.

Besides DCP, the next release of the software will support other APIs, including IBM's High Level Language API and the Server Requester Programming Interface, Boyce said.

AT&T will demonstrate the products with the Basic Rate Interface and DCP this week at the Tele-Communications Association, Inc. show in San Diego, he said. Personal computers will be outfitted with the E78 Plus/ISDN software and attached to a System/85 PBX located on the show floor. The PBX will be linked via a T-1 line to a mainframe in Denver.

Dzubeck, who said he has seen benchmark tests of the product, gave it high marks for performance. He said it provides the same speed as a personal computer directly connected to a mainframe.

Scheduled to ship in March 1990, the BRI card costs $1,395. The E78 Plus/ISDN software, which will be sold and supported by AT&T but will carry the DCA name, is scheduled for availability in December and costs $395.

US Sprint lands $23m pact to upgrade FBI net

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — The Federal Bureau of Investigation last week awarded US Sprint Communications Co. a 10-year, $23 million contract to upgrade and expand the agency's nationwide data network.

US Sprint will replace the existing 9.6K bit/sec and 56K bit/sec lines that make up the backbone of the agency's computer communications network with 18 T-1 and seven 56K bit/sec circuits, said David Wade, chief of telecommunications services at the FBI.

Through the contract, US Sprint will provide the bulk of the agency's data transmission service. Tail circuits provided by other carriers, including AT&T and MCI Communications Corp., will remain.

The upgrade is necessary because the net is near capacity.

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The data network deal is an extension of the FBI's participation in the Federal Telecommunications System (FTS) 2000 contract. Under terms of that contract, the FBI was assigned to the US Sprint portion of the FTS 2000 network for switched voice services. The agency was also required to procure any future network services from the carrier.

According to Wade, the upgrade is necessary because the data network is nearing its capacity limit. Traffic volume has reached a point where T-1 service has become more economical than adding new 56K bit/sec lines.

Wade estimated that the agency will save $120,000 in the first year of the US Sprint contract by switching to T-1 service.

The FBI's Computer Applications Communications Network supports about 6,000 agents and support personnel at more than 500 locations nationwide. It carries administrative, financial and investigative data. US Sprint will begin upgrading the network in November and expects to complete the project in January.

Firm speeds delivery of ads via satellite

continued from page 6

digital signals that are transmitted via satellite to newspaper printing houses. An earth station, owned by Teleport Communications-New York on Staten Island, N.Y., uploads fax signals to a C-band satellite that broadcasts the information to newspapers in 32 states.

The company's Chicago and Los Angeles offices transmit fax signals to the New York Teleport via a Ku-band satellite; the New York office uses terrestrial lines to get to the Teleport.

Newspapers receive the transmissions over a 3.2-meter satellite dish, which most of them already use to receive Associated Press, Inc. wire stories. The signals are sent to a multiplexer, which separates text and image data. The text data, containing information about the ad order, is sent to a printer. The image data is sent to a high-resolution fax machine controlled by a personal computer.

Hayden said AD/SAT has installed about $100,000 worth of equipment in each newspaper plant.

Whether snow or sleet . . .

Hayden claimed advertisers can reduce their costs by as much as 70% when using AD/SAT. Moreover, AD/SAT delivers ads to newspapers in three minutes instead of the 12 to 20 hours it takes for a courier to deliver materials.

AD/SAT saves advertisers the cost of producing multiple copies of an ad that must be distributed to dozens of newspapers. Advertisers deliver a single ad to AD/SAT, which then broadcasts the ad to multiple locations simultaneously over its satellite network.

Since the cost of reproducing a single ad averages $20, production costs can quickly skyrocket when using other delivery methods, said Donald Demarest, senior vice-president and manager of print production at Young and Rubicam, Inc., a New York advertising agency.

"We use AD/SAT when we want to send multiple copies of an ad," Demarest said. "It's also useful when we need a rush delivery, which often is the case in advertising."

AD/SAT charges advertisers $60 to distribute an ad to just one location. The charges drop to $24 per transmission when an ad is distributed to 10 or more newspapers, Hayden said.

AD/SAT must transmit four copies of each color ad — each copy corresponding to a different piece of film in a four-color separation. Printers use the fax copies to produce the film, which is then used to make the metal plates that are used in a printing press to create a color ad.

More reliable

Along with speed and cost savings, AD/SAT provides a more reliable way to distribute ads, according to Hayden. Couriers can be delayed by weather conditions, traffic jams or human error.

Many advertisers are submitting time-sensitive ads that can cost $25,000 or more, and they run the risk of losing business when ads don't arrive on time. Newspapers can lose significant revenues if ads are lost or don't arrive on time.

"Before AD/SAT, we spent many stormy Saturdays waiting to see if our retail ads from New York would arrive in time for the Sunday paper," said Rich Masotta, division sales manager for *The Boston Globe.*

POS net paying off for Amoco and its dealers

By Jim Brown
Senior Editor

CHICAGO — Amoco Oil Co. last week said the installation of a nationwide point-of-sale network is already helping the company improve gasoline deliveries to dealers, collect payments faster and reduce credit card fraud.

Roughly 2,400 of the 3,700 Amoco-owned stations around the country have been linked to the Electronic Sales Processor network since 1986. The remaining stations will be brought onto the network over the next year.

Amoco leases these stations to dealers. Another 7,700 independently owned stations that sell Amoco gas will be given the option of installing Electronic Sales Processing at their own cost in the future.

> The network supports Amoco's strategy of charging dealers for gasoline after it is sold to customers.
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The network supports Amoco's strategy of charging dealers for gasoline after it is sold to customers. Other gas companies force dealers to buy gas before it is loaded into underground tanks, thus forcing them to carry debt on their books until the gas is sold. Amoco hopes the strategy will encourage dealers to sell its products.

Rick Hinojosa, Electronic Sales Processing technical support specialist, said the POS network helps Amoco collect inventory and sales data from each of its service stations every 24 hours. This information helps Amoco bill dealers for gas the next day, about a full day earlier than was previously possible.

(continued on page 101)

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DC201CR/M	2400 Sync Modem Card	795	595
DC2030	56kbs Local Data Set	850	550
DC208B/A	4800bps Sync, PL, DDD Mdm	1,345	860
DC208B/A R/M	4800bps Rack Mount Modem	1,255	850
DC224 R/M	2400bps Rack Mount Modem	495	316
DC296 R/M	V.32 Rack Mount Modem	1,725	1,101
DC4800	4800bps Sync, PL Modem	1,145	730
DC500/56K-A	56kbps DSU/CSU W/RS-422	795	507
DC500A R/M	9600bps DSU card	695	445
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DT202	Desktop 202 Modem	400	242
DT208	Desktop 208 Modem	1,095	730
DT9600	Desktop 9600 Modem	1,095	795
GSU500A	Data/Channel Service Unit	695	459
LCM1020	19.2kbps Async Data Set	295	225
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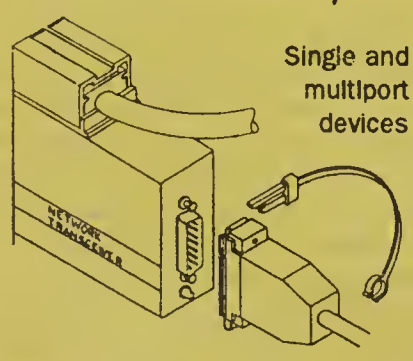

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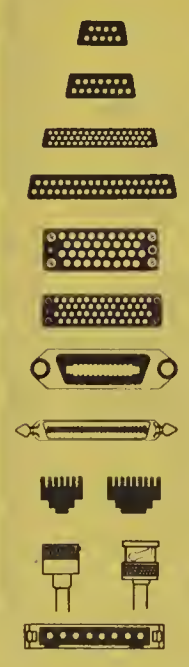

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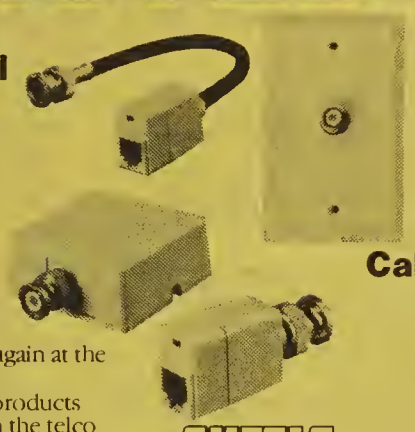

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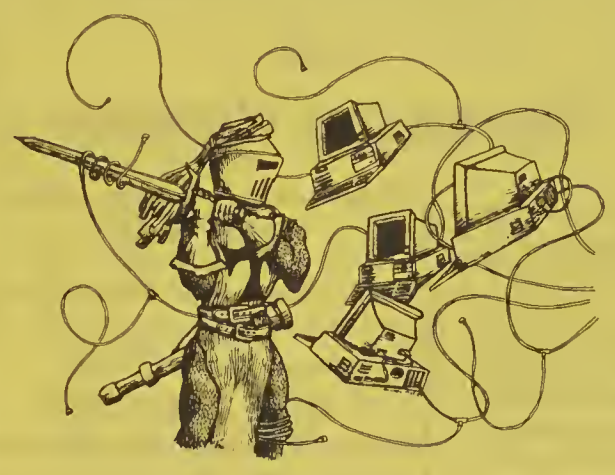

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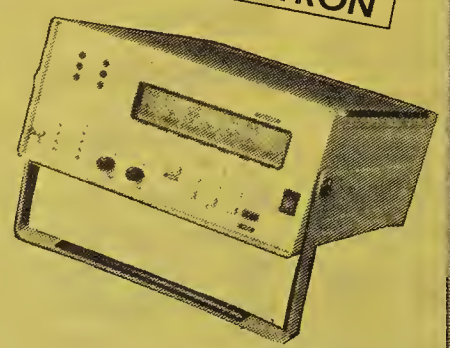

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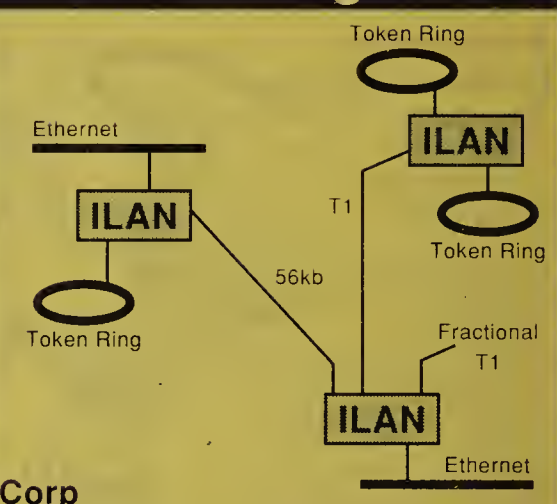

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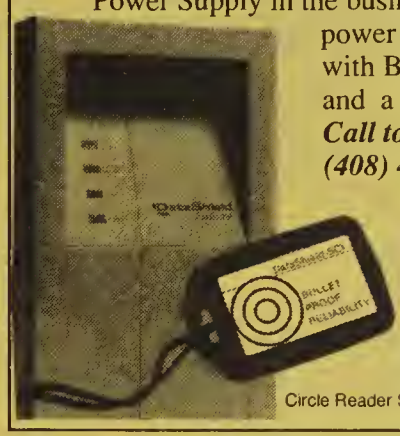

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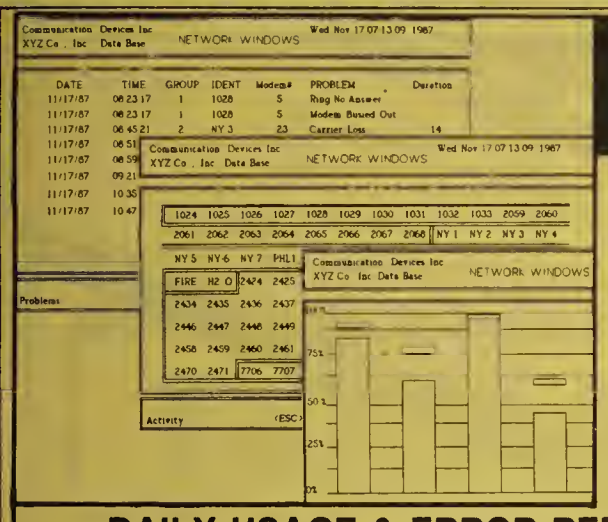

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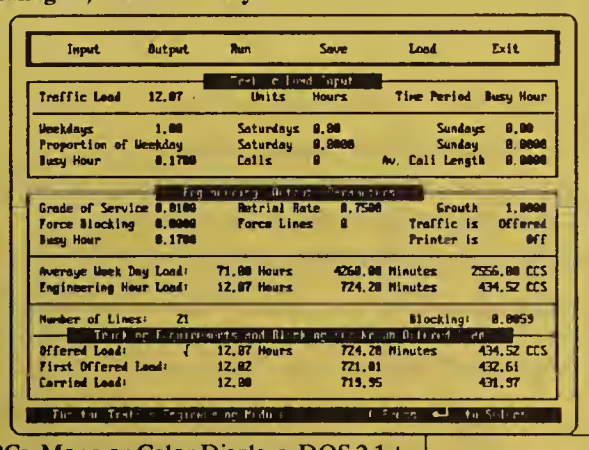

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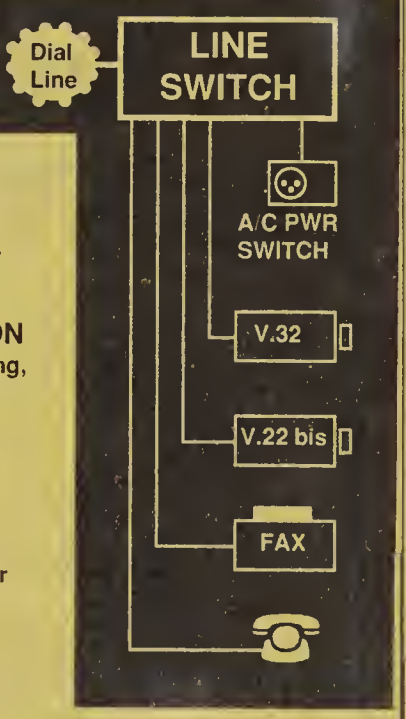

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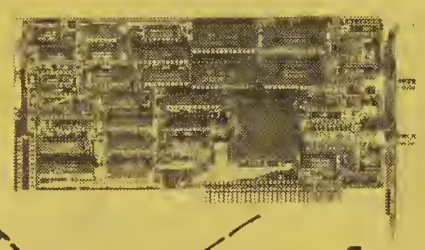

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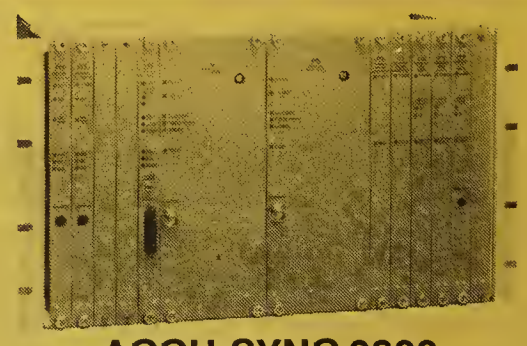

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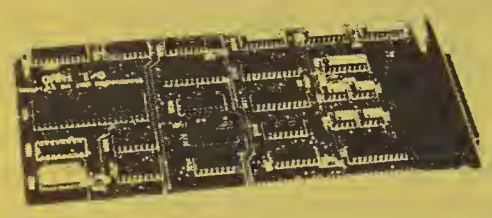

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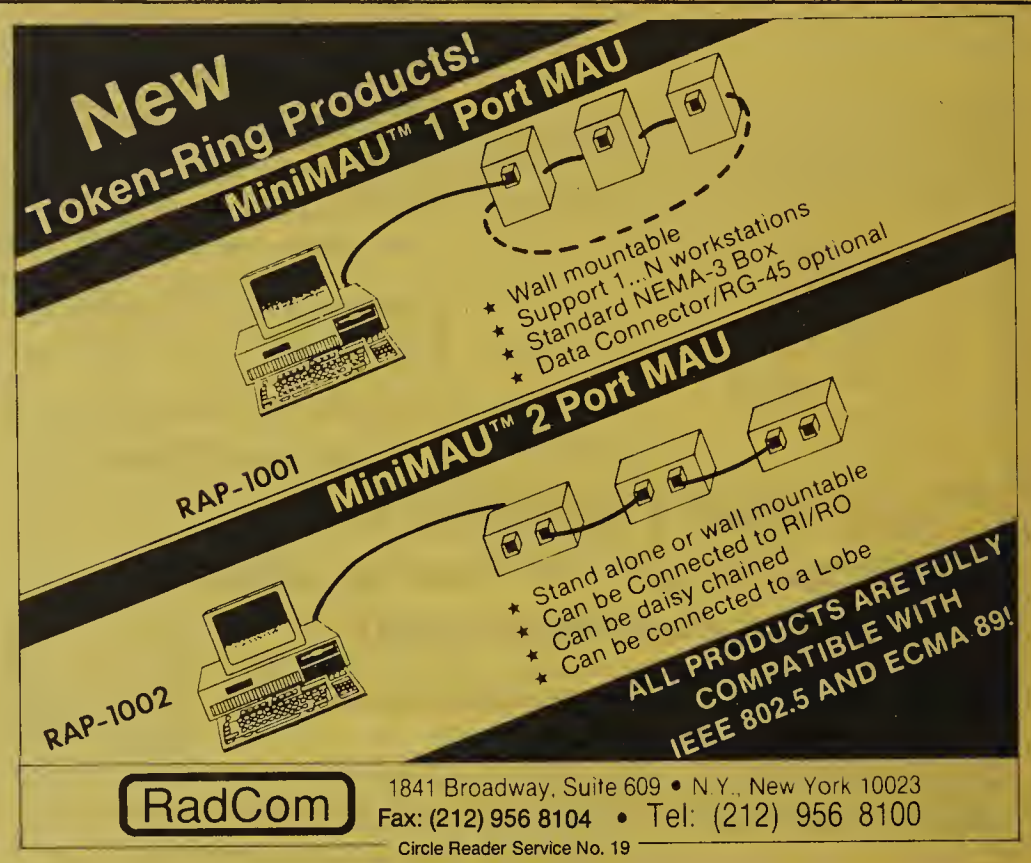

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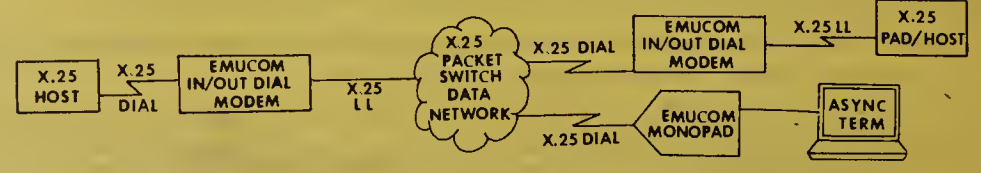

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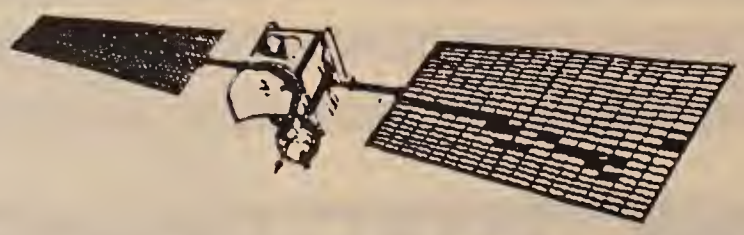

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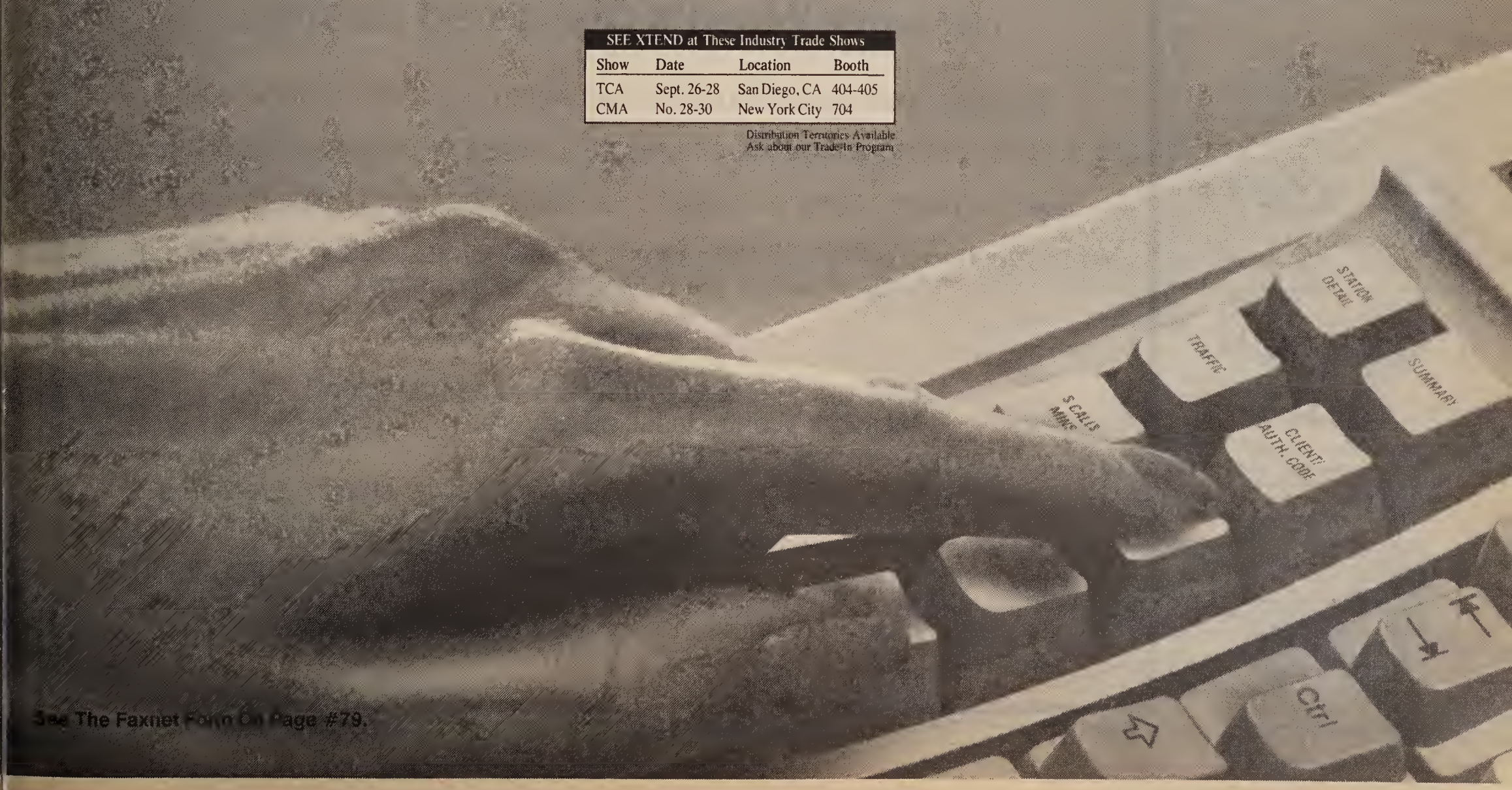

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Any business that has over twenty centralized dial modems can benefit from Communication Devices Inc., says Tadhg Kelly, the company's Vice President for Marketing. CDI's PC-based Network Windows™ monitors and controls up to 960 dial-in modems and provides usage/error reports and includes a feature that lets calls skip over a modem in a ring/no answer situation.

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"We're out to reach communications managers and catch their eyes. And our desired result is sales. When CDI advertises, we want the phone to ring the next day. To put it another way, we're not after image advertising — we're after sales.

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NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies
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Effort to build net gains momentum

continued from page 21

bined with a decrease in military spending, has created a shift in the government toward technology-related spending. "The government recognizes that to deal with American competitiveness, you have to deal with supercomputers," he said.

The value of sharing data

Witnesses at the hearing held by the Senate Subcommittee on Science, Technology and Space said creation of a high-capacity national network would build on the value of their existing networks by enabling them to share technical and graphical data that can be sent only over very high-bandwidth channels.

Daniel Masys, director of the National Library of Medicine's (NLM) Lister Hill Center for Biomedical Communication, said the NLM operates a network called the Medical Literature Analysis and Retrieval System that gives health care professionals access to more than 20 medical data bases.

While most of the data transmitted is textual, NLM would like to transmit more pictorial and graphical images. That is impossible today because of the capacity constraints of the commercial networks NLM uses. "To transmit a single black and white X-ray would take more than 10 hours," Masys said.

John Fischer, acting associate director of the U.S. Geological Survey (USGS), said a national network would allow the USGS to share more data about earthquakes, contaminated groundwater systems and global climate changes with agencies nationwide.

John Seely Brown, vice-president of advanced research at the Xerox Palo Alto Research Center, said Xerox Corp. could use the national network to help link its distributed design teams all over the world, increasing the company's product design efficiency.

FRICC divides the network's development into three stages.

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The right connections

While some people have suggested that large corporations should be able to finance their own gigabit connections between remote sites, Gore said that to ask a company — even one the size of Xerox — to take on such a project "would be like asking a delivery company to build an interstate highway system."

Gore's bill and the OSTP proposal both envision the government's role in the network as a limited one. "Eventually, the marketplace will allow this network to be financed by the private sector," Gore said. However, he added, government funding is needed to get the project over the initial inertia.

The OSTP asked the Federal Research Internet Coordinating Committee (FRICC) — a collaboration of the National Science Foundation (NSF), the Defense Advanced Research Project Agency (DARPA), the Department of Energy (DOE), the National Aeronautics and Space Administration and the Department of Health and Human Services — to propose a deployment plan for a national network.

In its report, FRICC divides the network's development into three stages.

Stage 1 would entail upgrading and interconnecting existing agency networks to achieve a national network operating at 1.544M bit/sec. At some agencies, this effort is already under way.

Also, existing links between agency networks and the national network would be replaced by new gateways — dubbed Research Internet Gateways. Vendors are currently developing these gateways for DARPA and NSF. The gateways will enforce traffic-routing policies to ensure that agencies can control the traffic flow into and through their networks.

Stage 2 would focus on establishing a 45M bit/sec backbone shared among DARPA, DOE, NASA and NSF. It would be built by interconnecting the National Science Foundation Network (NSFNET) with the Research Interagency Backbone (RIB), a network shared by DARPA, DOE and NASA.

Existing links between agency networks and the national network would be replaced by new gateways.

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NSF would coordinate the project in Stage 1 and Stage 2, and would be given $192 million to fund these two stages.

Stage 3 would concentrate on research and development activities for creating a national network operating at gigabit speeds. According to the report, it would not be technically or economically feasible simply to upgrade current networks with higher speed switches and high-capacity lines to achieve gigabit rates.

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US Sprint adds new digital services

continued from page 1

channel increments at 112K, 168K, 224K, 280K, 336K, 392K, 448K, 504K, 560K, 616K and 672K bit/sec.

The name of the service, however, is something of a misnomer. Unlike AT&T, US Sprint has to offer fractional T-1 service in 56K bit/sec increments because it uses a line-coding technique called alternate mark inversion that uses eight bits within each 64K bit/sec channel for transmission management, leaving only 56K bit/sec for data transmission.

AT&T uses the preferable bipolar eight zero code substitution (B8ZS) line-coding scheme. That line-coding scheme frees up 8K bit/sec, providing users with what is known as a clear channel for data transmission.

B8ZS on the way for US Sprint

US Sprint will offer a clear channel option to Clearline Fractional 1.5 customers when it completes deployment of B8ZS in its network by mid-1990, according to Greg Crosby, US Sprint's product development group manager for private-line and data services.

Clearline Fractional 1.5, as well as the two other new services, are available now through US Sprint's more than 200 points of presence (POP).

In contrast, AT&T's Accunet Spectrum of Digital Services is currently available through 67 POPs and will be deployed in a total of 175 cities by May 1990.

Digital Access and Cross-Connect Systems installed at each of US Sprint's 43 main switching centers enabled the carrier to offer fractional T-1 services throughout its long-haul network.

> Unlike AT&T, US Sprint has to offer fractional T-1 service in 56K bit/sec increments because it uses alternate mark inversion.
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US Sprint's fractional T-1 services are priced in 56K bit/sec increments and carry a fixed monthly charge as well as a per-mile charge, which is calculated using mileage bands — 0 to 50 miles, 51 to 100 miles, and 101 miles and up.

Service rates for circuits 50 miles or shorter, for example, cost $121 per month and $4.68 per mile, while circuits longer than 100 miles cost $2,306 per month and $2.68 per mile.

Clearline Fractional 1.5, like the other new services, also carries miscellaneous installation and ongoing monthly charges, including central office connection fees and access coordination fees.

(continued on page 99)

Clearline Fractional 1.5
Figure 1

Bandwidth (bit/sec)	Mileage band	Fixed rate	Per-mile rate
112K	1-50	$121	$4.68
	51-100	248	2.16
	100+	413	0.48
168K	1-50	178	6.89
	51-100	366	3.18
	100+	609	0.71
224K	1-50	237	9.18
	51-100	487	4.23
	100+	810	0.94
280K	1-50	284	10.97
	51-100	583	5.06
	100+	970	1.13
336K	1-50	358	13.83
	51-100	735	6.39
	100+	1223	1.42
392K	1-50	407	15.67
	51-100	833	7.23
	100+	1385	1.61
448K	1-50	455	17.56
	51-100	933	8.10
	100+	1552	1.81
504K	1-50	511	19.68
	51-100	1047	9.09
	100+	1740	2.03
560K	1-50	538	20.74
	51-100	1103	9.57
	100+	1834	2.13
616K	1-50	621	23.95
	51-100	1274	11.05
	100+	2117	2.46
672K	1-50	677	26.08
	51-100	1387	12.04
	100+	2306	2.68

SOURCE: US SPRINT COMMUNICATIONS CO., KANSAS CITY, MO.
GRAPHIC BY SUSAN SLATER

Clearline Voiceband and Clearline Digital Data Services (all speeds)
Figure 2

Contract term	Mileage band	Fixed rate	Per-mile rate
Monthly	1-50	$65	$2.56
	51-100	135	1.18
	100+	223	0.29
1-year	1-50	62	2.46
	51-100	130	1.13
	100+	214	0.28
2-year	1-50	60	2.38
	51-100	126	1.10
	100+	207	0.27
3-year	1-50	57	2.25
	51-100	119	1.04
	100+	196	0.26
4-year	1-50	56	2.20
	51-100	116	1.01
	100+	192	0.25
5-year	1-50	54	2.12
	51-100	112	0.98
	100+	185	0.24

SOURCE: US SPRINT COMMUNICATIONS CO., KANSAS CITY, MO.
GRAPHIC BY SUSAN SLATER

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Bytex plans rollout of matrix switch

continued from page 4

see a matrix switch that exclusively supports T-1 lines. "So far as I know, there are no other matrix switches on the market that do this," said Mark LaRow, an analyst with Ernst & Young's Network Strategies in Fairfax, Va.

The switch, he said, may help users manage T-1 networks that use a mix of channel banks and point-to-point T-1 multiplexers, which are not able to switch devices from failed T-1s to operational circuits. But those users may be able to obtain a good deal of the functionality of a DNS from either an intelligent switching T-1 multiplexer or a digital access and cross-connect system (DACS) that switches 64K bit/sec channels from one T-1 to another.

The major benefit of the DNS over a DACS or an intelligent T-1 multiplexer, LaRow said, is that the DNS will support attachment of various test equipment that measures bit error rates or line jitter. Today, users must physically attach that test equipment to the T-1 line via a patch panel.

Available now, the DNS ranges in price from $35,000 to $100,000, depending upon configuration.

Software upgrades

Bytex also plans to announce optional software for its Unity Management System that enables it to test and control remote Unity 10, Unity 30 and Unity 50 matrix switches.

The Remote Center Management software runs on the central site Unity Management System, which is linked to remote Unity switches via dial-up or leased lines, and eliminates the need for a management staff at the remote locations. Pricing for the optional software, which is available now, has not been set.

Finally, Bytex is announcing versions of its Unity NetWork Link software for the Unity 10 and Unity 30 switches. The software works with IBM host-based Matrix Switch Host Facility 2 (MSHF 2) software, which Bytex developed jointly with IBM, to interface the Unity switches to IBM's NetView network control system running on a mainframe. With the software, NetView consoles can emulate the Unity management station.

Unity NetWork Link software and MSHF 2 software eliminate the need to use NetView/PC to link Unity switches to NetView. It also enables users to build NetView command lists that detect an alarm for a specific problem and automatically invoke the commands needed to rectify it.

Previously available only on the Unity 50, Unity NetWork Link software for the Unity 10 and Unity 30 costs $5,100 and is available now. The software is not currently supported on the DNS.

The major benefit of the DNS over a DACS or an intelligent T-1 multiplexer, LaRow said, is that the DNS will support attachment of various test equipment that measures bit error rates or line jitter.

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US Sprint adds new digital services

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The carrier only offers Clearline 1.5 on a monthly basis; no long-term contracts are available.

US Sprint's fractional T-1 service is most cost-effective for users that need four to eight channels for a single site, according to Crosby.

Michael Hills, president of HTL Telemanagement, Ltd., a Burtonsville, Md.-based tariff analysis firm, said Clearline Fractional T-1 is 10% to 20% less expensive than AT&T's fractional T-1 service.

Tie lines and DDS

US Sprint also introduced Clearline Voiceband, a 64K bit/sec service that can be used as a digital alternative for trunks working as tie lines, foreign exchange links, off-premises extension lines and ring-down circuits. The interoffice portion of each circuit is all-digital but can be accessed via a voice-grade or T-1 local access line.

The new Clearline DDS family of services are offered at 2,400, 4.8K, 9.6K and 56K bit/sec. The services can be accessed through DDS provided by local telephone companies or through existing T-1 access lines.

Unlike other carriers, US Sprint will not guarantee error rates for its DDS.

US Sprint offers monthly and one- to five-year contracts for Clearline Voiceband and Clearline DDS.

The company said it can deliver Clearline Voiceband service in 45 days after receipt of order and Clearline DDS and end-to-end fractional T-1 circuits in 60 days. These figures include the time required to set up local access at each end of the line.

At least two other carriers, Cable & Wireless and AT&T, can deliver fractional T-1 service faster. Cable & Wireless can provide users with service in as little as three to five days, while AT&T can deliver in 11 days.

AT&T files Tariff 12 deals

continued from page 2

spending by region, organization or other criteria and to highlight changes in monthly costs.

The Unisys network will consist of 2,646 voice ports and 659 data lines, including 93 T-1 circuits.

Per-minute prices for on-net calls placed during business hours range from 5.5 cents for a 200-mile call to 10.3 cents for a 5,000-mile call.

J.C. Penney also negotiated special provisions. Even though its contract is written as a five-year deal, the company reserved the right to cancel without penalty after three years if it is not satisfied with the service. J.C. Penney also negotiated an AT&T guarantee that overall network downtime will be limited to 0.3% per year.

MasterCard signed a three-year contract with the option to renew for a fourth year. Concerned about network reliability, the company negotiated a provision that allows it to cancel without penalty if total network availability falls below 95% for two consecutive months. MasterCard may also cancel a portion of its network deal if it encounters three or more voice or data service disruptions of more than four hours within three consecutive months.

If AT&T fails to live up to the terms of its contracts with Unisys, J.C. Penney or MasterCard, the customers may cancel without penalty and AT&T will pay any installation charges incurred by the customer to switch to a new AT&T service or an offering from another carrier. Several previous Tariff 12 customers also have this provision in their contracts.

J.C. Penney's network will include almost 6,000 voice ports and 464 data lines, including 202 T-1 circuits. Per-minute prices for on-net calls placed during business hours range from 6.1 cents for a 200-mile call to 13 cents for a 5,000-mile call.

However, AT&T documents filed with the FCC show that 84% of J.C. Penney's traffic is projected to be from on-net to off-net sites, between off-net sites or from 900 numbers. Prices for these types of calls will range from 10.8 cents per minute for a 200-mile call to 17.6 cents per minute for a 5,000-mile call.

Prices for additional T-1 circuits will include a $500 installation charge and will be based on two mileage bands. For lines less than 100 miles, the company will pay $1,710 monthly plus $9 per interoffice mile. For lines over 100 miles, the charge is $1,900 plus $7.10 per interoffice mile.

During any month that J.C. Penney's measured charges are between $30,000 and $1 million, the company will qualify for a 3% volume discount. For charges between $1 million and $2 million, a 10% discount applies; and for charges over $2 million, a 20% discount applies.

J.C. Penney is also eligible for discounts on its data communications services. When monthly charges for 9.6K bit/sec, 56K bit/sec and T-1 services exceed $250,000, a 10% discount will apply to charges for deleting or adding 56K bit/sec lines and a 34% discount will apply to charges for deleting or adding T-1 lines.

MasterCard's network will consist of 1,232 voice ports and 246 data lines, including 34 T-1 circuits. Per-minute prices for on-net calls placed during business hours range from 5.9 cents for a 200-mile call to 12.5 cents for a 5,000-mile call.

However, AT&T told the FCC in its filing that 75% of MasterCard's traffic will come into the network via 900 numbers. Rates for these calls will range from 16.2 cents for a 200-mile call to 28.2 cents for a 5,000-mile call.

To add T-1 lines to the network, MasterCard will pay a $500 installation fee plus monthly charges of $2,750 and $8.25 per interoffice mile.

> If AT&T fails to live up to the terms of its contracts with Unisys, J.C. Penney or MasterCard, they may cancel without penalty.
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POS net paying off for Amoco

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In addition, the network collects data from underground tank-monitoring systems that helps Amoco determine when tanks need refilling. By analyzing inventory and sales data, and monitoring tanks, Amoco can detect whether gas is being stolen or a tank is leaking.

Electronic Sales Processing also enables dealers to authorize purchases made with Amoco's credit cards, as well as Visa U.S.A., Inc. and MasterCard International, Inc. credit cards, before gas is pumped into a customer's car. This helps reduce the risk of accepting stolen cards or cards that have exceeded credit limits.

"[Electronic Sales Processing] tremendously expands our ability to cut bad credit card sales," said an Amoco spokesman. It also replaces outdated credit card-authorization terminals, which dealers often did not use.

With Electronic Sales Processing, Amoco can also update customer credit card account records instantaneously. This would prevent customers who are nearing their credit limits from buying gas at a number of stations in one day and exceeding their credit limits. Customers often refuse to accept liability for charges made after credit limits have been exceeded.

Authorizations take three to five seconds to complete, said Amoco's Richard Smith.

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Each station is equipped with an electronic cash register that is used to total gas sales and purchases made at convenience stores located at many Amoco-owned stations. Made by Schlumberger Industries, a unit of Schlumberger, Ltd. of France, the Micromax cash register is also tied to electronic gas pumps. This allows dealers to turn pumps on and off automatically, recording in the process the number of gallons each pump dispenses.

E-mail capability

The Micromax also includes a credit card reader terminal and can receive electronic mail messages sent by Amoco.

In addition to recording gas and convenience store sales data for dealer use, the Micromax transmits daily gas sales and inventory data to Amoco's Electronic Sales Processing center in Des Moines, Iowa. This data is transmitted over a leased line using services purchased from J.C. Penney Business Services, Inc., which sells capacity on J.C. Penney Co., Inc.'s internal net.

The Micromax is also linked to an underground gas tank-monitoring system. The system forwards signals from probes in underground tanks via an RS-232 link to the Micromax, which in turn forwards the data to Des Moines.

Each Micromax terminal is equipped with an AT&T Paradyne modem that transmits data over a 2,400 bit/sec leased line to an IBM Series/1 minicomputer in a nearby J.C. Penney retail store. J.C. Penney routes the traffic over its network to an IBM mainframe in Amoco's Electronic Sales Processing center in Des Moines ("J.C. Penney shines in role as vendor," *NW,* Sept. 11).

The Des Moines center authorizes Amoco credit card transactions and has a link to Visa's VisaNet and MasterCard's Banknet for authorization of Visa and MasterCard credit cards. Authorizations take three to five seconds to complete, said Richard Smith, Electronic Sales Processing administrative support specialist.

The Des Moines center also processes sales and inventory data collected from the dealers. Amoco then sends an E-mail message to the Micromax, detailing how much each dealer owes Amoco for the gas sold. Dealers can view the E-mail messages on a small LCD screen attached to the Micromax, which is usually used to display the amount of a transaction.

Dealers can submit a check to cover the payment or allow Amoco to tap their bank accounts using electronic funds transfer. Previously, dealers had to submit forms to Amoco that detailed how much gas each pump dispensed, along with a check to cover the cost of the gas.

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IBM serves up SAA development strategy

continued from page 1

Server-based local network to share files, printers and host access.

The approach lets users take advantage of the workstation's relatively inexpensive processing power and rapid response time while taking some of the development load off the mainframe. Today, programmers in many large IBM shops work primarily on mainframe-attached terminals.

"Mainframes are getting crowded with development work," said Steven Pfrenzinger, president of IMS Consulting, Inc. in Northridge, Calif. "IBM views the distribution of this development work to a workstation as a cost savings issue as well as a performance gain."

A number of the Personal System/2-based computer-assisted software engineering (CASE) tools IBM rolled out under AD/Cycle come from three main business partners: Index Technology Corp., KnowledgeWare, Inc. and Bachman Information Systems, Inc.

Today, programmers use a number of development tools from various sources that have different interfaces and cannot share data, said John Hemming, manager of market strategy in IBM's programming system line of business. AD/Cycle products will comply with SAA's Common User Access specification.

This provides a common way of accessing development tools such as the respository, which helps users track development and share data.

Analysts applauded AD/Cycle as the industry's first coherent approach to application development, but they said it will be years before users see applications developed using AD/Cycle tools. IBM acknowledged that the strategy will be "implemented in an evolutionary manner" and said it won't deliver the repository until June 1990.

Repository Manager/MVS Version 1 Release 1 is intended to give developers a central storage facility for data, with screen layouts, program files and report specifications, Hemming said.

The product stores items in object form. A particular object may represent a number of elements stored in various places across a network. The repository uses DB2, IBM's relational data base management system, to store the various components of an object and deliver them to a requester, Hemming said. The respository will help coordinate the activities of disparate programmers working on a common project, Hemming said.

"The implications are that networking is going to be significant," said Capers Jones, chairman of Software Productivity Research, Inc., a consultancy and software development company in Acton, Mass. "About a third of all software projects involve multiple departments, and about a fifth involve multiple cities. You need to have developers in these multisite, multicity departments networked together."

As expected, IBM last week made little mention of the repository's role under NetView. Although it gave no time frame, the company said it intends to use the repository to manage Network Control Program and VTAM system definitions, which is less than some people expected.

"Big deal," said Frank Dzubeck, president of the Washington, D.C. consultancy Communications Network Architects, Inc. "It had nothing to do with what they were talking about before."

Dzubeck said he had expected that the repository would be used under NetView to store alert and alarm histories, topology changes, service call history and other information users need for trend analysis and real-time alarm correlation.

IBM defended its NetView strategy. "This is [NetView's] entry into the repository area," said Helen Morse, manager of network management product marketing at IBM. She said IBM will add to the repository's role under NetView but declined to say when IBM will flesh out that strategy.

Since it is an SAA-sanctioned product, the repository will be ported to other SAA operating systems including VM and OS/400, although Hemming declined to say when. He also declined to say whether the company will port the repository to OS/2 Extended Edition.

It will take two or three years of "cultural brainwashing" to get users acclimated to CASE because they are accustomed to more labor-intensive application development methods, Dzubeck said.

Other analysts agreed and said AD/Cycle will likely follow the pattern of previous IBM moves, such as the introduction of Systems Network Architecture and DB2, which took years to gain momentum.

Slated to ship on June 29, 1990, one-time charges for Repository Manager/MVS range from $94,080 to $243,000, depending on the processor used. Monthly license charges range from $1,960 to $4,500.

System One on the block, EDS a bidder

continued from page 4

of surviving government scrutiny because it involves smaller players in the reservation industry, Fuchs said. "There will probably be no regulatory hurdles," he said.

A Delta spokeswoman declined to estimate when the deal would be completed or how the new reservation system would be structured. She said, however, that the reservation system being discussed would be established as an independently operated company with its own management.

Having control of airline reservation nets is a significant advantage to airlines because the systems provide them with information that allows them to manage their business better, said William Church, director of The Center for Telecommunications and Computer Information in Madison, N.J. "The airlines live and breathe off the information they have," he said.

Vendors to unleash FDDI products

continued from page 2

scurrying about trying to clear it."

The FDDI market is still small — less than $5 million in annual revenue — restrained by the high cost of implementation and the continuing addition of final touches to FDDI by ANSI, said Lee Doyle, an analyst for International Data Corp., a research firm in Framingham, Mass.

FDDI compatibility

The Interop demonstration should help show that the FDDI standard is resulting in compatible products, Doyle said. But he added that prices will remain prohibitively high for most users until semiconductor manufacturers start producing FDDI chipsets in high volumes.

The demonstration and product introductions come on the heels of the formation of two key industry alliances that should start driving down costs and help reassure users about FDDI's stability.

Last week, Digital Equipment Corp. and Motorola agreed to cooperate on an FDDI chipset that Motorola will sell to DEC and other vendors beginning next year. Once both Motorola and AMD are in volume production mode, the supply of FDDI chipsets should help drive down the cost of building FDDI hardware.

"The silicon chips are relatively inexpensive to stamp out," said Mark Freund, president and chief executive officer of Interconnect Network Consulting Group, Inc. of Pasadena, Calif. "The cost is in the research and development."

In August, Hewlett-Packard Co., Siemens AG and AT&T signed an international multisourcing agreement that will provide the worldwide market with completely interchangeable optical transceivers for FDDI hardware.

Right now, the only part of the FDDI standard that has not been hammered out involves the station management software, which vendors agree can be added to current FDDI hardware via microcode upgrades.

"It's not going to affect the chips," said Rhonda Dirvin, manager of communications very large-scale integration marketing for Motorola.

But prospective FDDI users remain wary. "I'm hesitant about FDDI because I'm not fully convinced that the FDDI standard is solidified, and that makes me want to wait until interoperability is a proven thing," said Ward Keever, vice-president of information systems at the Medical Center of Delaware in Newark.

Keever said he was glad to see this fall's rush of FDDI product announcements. "It makes me feel confident that FDDI will become a reality within a year, in terms of standard products and lower prices."

Meanwhile, Keever added, the medical center is not yet taxing the 10M bit/sec bandwidth of its existing Ethernet backbone so he has the luxury of waiting.

One company that decided not to wait is Coors Brewing Co. of Golden, Colo., which has an FDDI backbone connecting six of its buildings. "The 100M bit/sec bandwidth is more than we need right now, but by getting it in early, we don't have to go back and retrofit," said Bill Rolfe, a Coors

Companies set to introduce FDDI routers

SAN JOSE, Calif. — Proteon, Inc. and cisco Systems, Inc. are slated to announce next week net routers designed for 100M bit/sec Fiber Distributed Data Interface (FDDI) local nets.

The products will be introduced at the Interop '89 show here, which will feature an FDDI interoperability demonstration with at least 10 vendors. Both routers are designed to integrate Ethernet and token-ring traffic on FDDI backbone networks.

An offering from cisco Systems, the FDDI Multi Protocol Router, will route traffic from Ethernet and token-ring subnetworks across FDDI backbones, according to Catherine Muther, vice-president of marketing.

The device is a stand-alone unit that connects up to five Ethernet or token-ring subnets to the FDDI backbone.

The cisco FDDI router will support Transmission Control Protocol/Internet Protocol, Open Systems Interconnection transport protocols, Apple Computer, Inc.'s AppleTalk Filing Protocol (AFP), Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems (XNS) and Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) protocol.

Cisco is planning to deliver the FDDI Multi Protocol Router in the first quarter of 1990.

The Proteon FDDI router, due out in the first half of 1990, is based on the firm's existing p4200 Multi-Protocol Router. The new p4200 FDDI Multi-Protocol Router is a stand-alone unit that sits between subnets and the FDDI backbone, and connect six local nets to the FDDI backbone. Like the current p4200 Multi-Protocol Router, the enhanced version will support TCP/IP, OSI, AFP, DECnet, XNS and IPX/SPX transport protocols.

The p4200 FDDI Multi-Protocol Router is fully compliant with the IEEE 802.5 FDDI standard specifying a dual counter-rotating ring configuration.

Pricing on the p4200 FDDI Multi-Protocol Router has not yet been set, but "it won't cost more than $15,000," Proteon said.

— Laura DiDio

network planner. Rolfe said FDDI's built-in redundancy has already proved its worth at Coors. "We had a file server crash in one building and were able to back it up on a file server in a building a couple of miles away. We were down for a couple of hours, and we didn't lose anything."

Rolfe said he expects the upcoming FDDI product introductions to drive down the cost of FDDI by at least a third. Figures from Dataquest, Inc., a market research firm in San Jose, Calif., indicate that Coors' expectations are on the mark.

"We see on average a 30% annual drop in the per-connection cost," said Brad Baldwin, a local net analyst for Dataquest. The firm estimates that the cost per FDDI connection — approximately $17,000 in 1988 — will have dropped to between $9,000 and $12,000 by year end.

Big carriers do battle on billing turf

continued from page 1

rivals say they are committed to supplying similar systems. AT&T last week rolled out new, enhanced billing tools (see "AT&T offers EDI billing, new net control services," page 2).

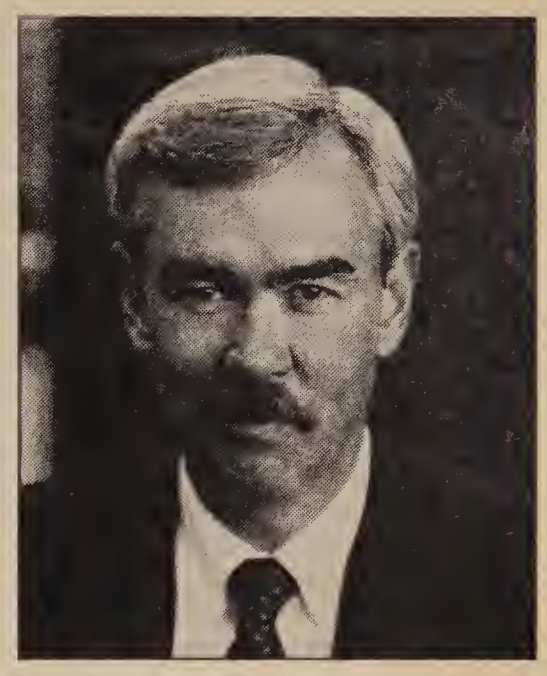
In addition, AT&T and MCI have offered customized billing arrangements in recent contracts with major customers, and US Sprint says it expects to introduce in the fourth quarter of this year an entirely new system for sending bills to customers.

"Billing will become a major competitive factor and a significant reason why people would choose one long-distance carrier over another," said Robert Self, founder of Market Dynamics, a New York-based telecommunications consulting firm. "Managing long-distance calls is probably as critical or more critical than choosing the right service."

Faced with sorting "a truckload of bills every month," Unisys Corp. recently signed up for a custom billing plan as part of a five-year Tariff 12 network agreement with AT&T. The billing system will allow the computer company to track costs by region and organization level ("Unisys picks custom net to slash costs," *NW,* Sept. 18).

Bard Haerland, Unisys' staff vice-president for world communications, said the custom billing was an important consideration in choosing AT&T's offering.

"I don't know that I would choose a carrier on that [custom billing] basis alone," he said, "But it is an important argument when you are choosing among carriers that are competitive with one another."



US Sprint's Cliff Hall

Billing capabilities were also a factor for Montgomery Ward & Co. in deciding to award MCI a three-year contract in August. MCI will set up a virtual private network linking the user's headquarters to 420 retail locations nationwide, said Chuck Edfors, the Chicago-based company's telecommunications manager.

Before choosing MCI, which had already been providing the retailer with customized billing at no cost for about a year, Montgomery Ward also looked at AT&T's Software-Defined Network service and compared summary and consolidated billing features.

"Since price and quality have gotten close, billing has been a fairly important factor in vendor selection," he said. "We're encouraging all the vendors we do business with to present us with billing that is easy for us to handle."

Users need flexibility in a billing system, agreed Bob Norian, corporate director for telecommunications and information systems at Allied-Signal, Inc., a diversified company with businesses in aerospace components, automotive products and engineered materials. A key factor in Allied-Signal's decision to sign a four-year, $40 million Virtual Telecommunications Network Services network contract with AT&T earlier this month was the custom billing package included in the deal, Norian said.

"Our company's organizational structure is different from that of most companies, so we needed a billing package that would be flexible," he said. Allied-Signal needs to provide bills to a number of separate business units as well as obtain bill summaries for a range of units, he said.

The importance of billing can be seen in users' requests for proposal, according to Adrienne Zecca, district manager of billing direction and strategy for all of AT&T's network services products. It is becoming quite common for large users to include detailed sections in the RFPs outlining billing requirements, she said.

Michael Kennedy, a senior consultant at Arthur D. Little, Inc. in Cambridge, Mass., said better billing is the key to helping users run their networks more easily.

"The primary thing a user needs to know to run an efficient telecom shop is the cost of running it," he said. "That's what a good billing system will tell you."

US Sprint's introduction last month of its personal computer-based Fonview billing system has been hailed by some industry watchers as the opening salvo in the billing battle ("US Sprint offers PC-based billing control system," *NW,* Aug. 21).

According to Cliff Hall, US Sprint executive vice-president and chief information

Hurricane Hugo wreaks havoc on carrier nets

By Gail Runnoe
Washington Correspondent

SAN JUAN, Puerto Rico — Hurricane Hugo last week severed communications between many U.S. companies and their operations in the eastern Caribbean here, as 140-mile-per-hour winds downed lines and disabled transmission equipment.

Late in the week, Hugo made its way up the Eastern Seaboard, slamming into Georgia and the Carolinas on Friday. Spokesmen for Southern Bell Telephone and Telegraph Co. said the company experienced no central office failures, thanks to emergency preparations made before the storm hit.

Southern Bell equipped switching centers with generators and batteries and switched power over to these sources before electricity was lost. This prevented damage to computer equipment from spikes and surges in electrical current.

Early estimates, however, showed that 10% to 15% of the customers in western South Carolina lost telephone service because of downed telephone lines.

An AT&T spokeswoman said long-distance service continued in the area as Hugo passed through, although exceptionally heavy calling volumes delayed the connection of some calls.

In the Caribbean, AT&T, MCI Communications Corp. and US Sprint Communications Co. said they had most of their facilities back in operation by week's end. But many calls still could not be completed because of outages affecting local carriers.

"It will probably be one to two months before all communications will be back up" in all the affected islands, said Daniel Briere, vice-president of Air Caribe International, a small airline based in San Juan.

Briere said his company's mainland headquarters in Boca Raton, Fla., could only communicate to a limited extent with its Puerto Rico facilities late last week and still could not reach St. Croix. In addition to the physical damage caused by the storm, looting and rioting hampered restoration efforts on St. Croix, he said.

Planned network improvements have been put on hold. Air Caribe was scheduled to have a new reservation system installed this week in preparation for December, when the company will begin operations as PanAm Caribbean Express, part of Pan American World Airlines, Inc. "The emphasis for all the phone companies will be to put back what was there before," not to install new services, Briere said.

Big carriers battle on billing turf

continued from page 107

officer, Fonview is designed to make it easier for users to handle their bills. The Fonview PC software enables users to analyze monthly billing data sent on a floppy disk according to a number of variables. Fonview is scheduled for general release in the fourth quarter of this year.

Both AT&T and MCI say they also want to bring billing control down to the personal computer level for easier management.

MCI, for example, will begin offering in the first quarter next year its Integrated Network Management Service, through which users can access detailed call records and usage statistics through an onsite personal computer, said Allan Ditchfield, MCI's senior vice-president for MIS.

In addition to providing large users with customized billing arrangements, AT&T last week introduced a number of new and enhanced billing and net management services under the umbrella heading of Accumaster Network Management Services. Among those services is an enhanced version of AT&T Detail Manager that provides customized billing reports for Megacom, WATS and 800 services customers, and an electronic data interchange bill delivery system.

Senior Writer Paul Desmond also contributed to this story.

Users debate farming out net control

continued from page 1

Next week, Hartford, Conn.-based United Technologies Corp. plans to receive final bids from vendors interested in taking on the job of managing the $18 billion diversified manufacturer's network facilities, as well as the building and operating of a new network management system for the company.

Rochester, N.Y.-based Eastman Kodak Co. hopes to award a contract by this November to a vendor that will take over day-to-day operations of its network control centers and handle network maintenance, moves, adds and changes (see "Big firms opt to farm out net operations," page 109).

If granted, the contract could last seven to 10 years and run into hundreds of millions of dollars, according to Allan Chase, group manager of computing and telecommunications services at the firm.

Assumptions questioned

By giving up day-to-day network control, users admit they forfeit any chance of gaining a strategic advantage from the way they manage physical transport networks. Companies can no longer gain an edge from physical networks because they are all virtually the same, proponents argue.

"It's a commodity business," said DuWayne Peterson, Merrill Lynch's vice-president of operations, systems and telecommunications. "I don't think compa-

nies have a massive advantage in the way they play their [physical] networks."

Jobbing out control of basic network operations also enables companies to focus resources on developing leading-edge network applications.

Robert Forte, director of communications services at United Technologies Corp., said, "We want our resources focused as much as possible on strategic applications such as videoconferencing, electronic data interchange and high-speed imaging and graphics. We don't think there is much of a benefit from managing the commodity parts of communications, such as dial tone and private networks."

Companies that contract out network operations can also benefit by leveraging the technical knowledge of vendors. Peterson said IBM and MCI personnel will be able to build Merrill Lynch a better network management system at a lower cost than the brokerage firm could on its own.

IBM and MCI will also find it easier to attract and keep qualified personnel to operate the network management center, which will control Merrill Lynch's network, Peterson said.

"It's a win/win situation," he said. "We get access to the skills and superior personnel of a vendor, and they get an extra source of revenue."

Increasing costs

Some users disagree, however, and argue that farming out basic network operations actually increases costs and decreases the quality of network service.

"It's an ill-advised move," said Kenneth Phillips, chairman of the Committee of Corporate Telecommunications Users, an association of approximately 30 of the nation's largest network users. Phillips is also vice-president for telecommunications policy at New York-based Citicorp.

"The long-term savings for a large company that competently manages day-to-day network operations itself is always higher than if it — to borrow a phrase from Greyhound — leaves the driving to the vendors."

Some users said vendors cannot be trusted to operate basic network services fairly and will always try to push their own products and services.

"Vendors have all sorts of marketing arrangements," said Vernon Winchester, manager of operations at one of McDonnell Douglas Aerospace Information Services Co.'s two main network control centers. "I'd be concerned that I wasn't missing out on potential savings because my vendor was pushing me to buy something he was associated with."

Users seeking vendors to take over network operations say they minimize those problems by dealing only with vendors they trust. Besides, the degree to which they can be manipulated is limited by the fact that they are only giving up control of day-to-day operations, they added. All critical decision making will be done in-house.

Even so, many users said they are squeamish about the idea of farming out network operations to a vendor.

"Citicorp would never do that," Phillips said. "We think that the way we manage network services gives us a competitive advantage."

Big firms opt to farm out net operations

By early this winter, two of the country's largest corporations hope to strike agreements to farm out their network operations to a vendor.

Hartford, Conn.-based United Technologies Corp. and Rochester, N.Y.-based Eastman Kodak Co. are seeking a vendor to maintain their network equipment, manage their network-related moves, adds and changes, and run their network operations centers. The companies are also looking for a single company to supply most of their transmission services through custom network contracts.

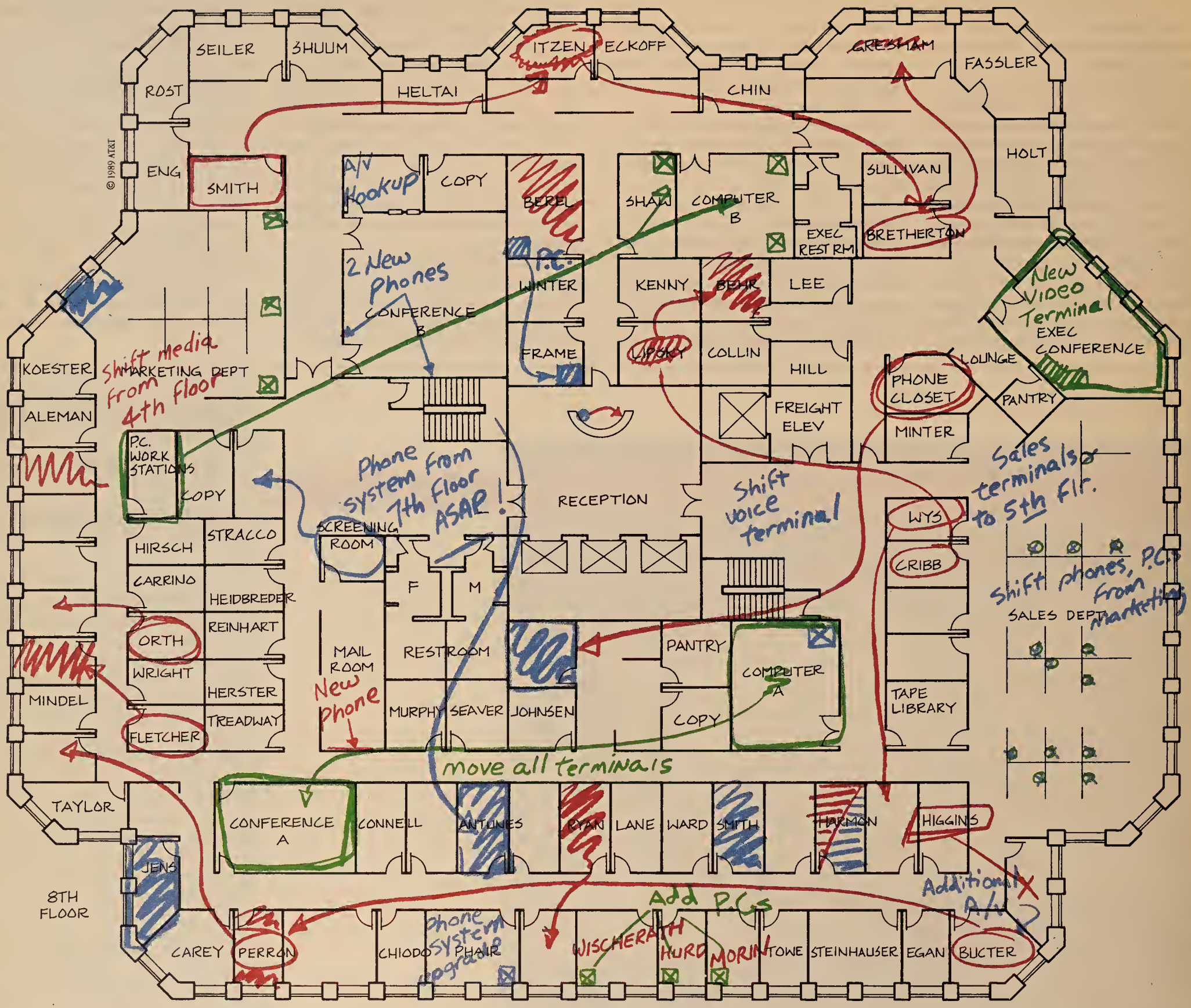
Communications managers at the two firms described the arrangements they are seeking as "partnerships," where vendor personnel would take over day-to-day operational chores while their own employees would establish network architectures and service-level requirements.

Both firms added that any deal could involve moving some of their employees onto the vendor's payroll. Neither Eastman Kodak nor United Technologies is certain that a contract will be awarded. Executives at both firms said contracts could be awarded to one or more vendors for the services put out to bid.

Allan Chase, group manager for computer and communications systems at Eastman Kodak, said his company hopes to be able to award a contract by early November. The contract award would complement a similar deal Eastman Kodak struck earlier this summer to have IBM consolidate and operate its data centers ("Kodak chooses IBM to run, upgrade its DP operations," *NW,* July 31). Chase said the communications contract, if awarded, could run seven to 10 years and total hundreds of millions of dollars.

Robert Forte, director of telecommunications services at United Technologies, said final bids on his company's request for proposal are due from vendors this week. A decision on whether to award a contract and which vendor to select should be made by late November, he added.

— Barton Crockett



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AT&T offers EDI billing services

continued from page 2

cumaster Integrator is the keystone of the company's previously announced Unified Network Management Architecture, which supports a variety of management systems for network products and services.

Accumaster Integrator, which has been endorsed by more than a dozen vendors, is based on an AT&T 3B2/600 minicomputer with one or more attached Sun Microsystems, Inc. workstations used as management consoles.

Analysts praised AT&T's efforts to expand the Accumaster Integrator to cover long-distance services.

"AT&T did a fine job of recognizing what the market needed and delivering those capabilities. The new services will be very well-received by users," said Bart Stuck, president of Business Strategies, a Westport, Conn.-based consultancy.

In the past, AT&T relied on third parties to provide products and services that enabled users to manage network services, according to Stuck. "But these new [management and billing] services represent a major change in direction for AT&T," he said.

New services

The new EDI Bill Delivery option enables customers to have private-line and SDN service bills delivered electronically using the ANSI X.12 format.

Delivering the bill via EDI reduces the chance of errors in manually inputting data into user-operated chargeback and billing analysis systems. The billing service requires that users translate billing data into a format compatible with their internal systems. AT&T sells hardware and software for use with the service.

In addition, AT&T enhanced its Accunet Information Manager (AIM) software for MS-DOS-based personal computers to support its Accunet T45, a 45M bit/sec T-3 service, and Accunet Spectrum of Digital Services (ASDS), its family of fractional T-1 services.

The software, which previously supported AT&T's Accunet T1.5 T-1 service, enables customers to review extended superframe format (ESF) circuit performance data collected by AT&T's network.

AIM displays alarms and configuration details, issues audible alarms and provides real-time data on circuit performance. Changing performance conditions are noted through color-coding.

AIM customers can use AT&T's Customer-Controlled Reconfiguration (CCR) service to take corrective action with the carrier's T-1 service. AT&T does not offer reconfiguration services for its Accunet T45 and ASDS.

The software uses AT&T's network management protocol (NMP) to link the minicomputer-based Accumaster Integrator to computers in the AT&T net, enabling users to download circuit information and premises equipment information.

The Accunet T1.5 service NMP interface will be available in the fourth quarter of 1989, but AT&T would not give pricing for the interface. The broader AIM service will be available in the first half of 1990.

The company also enhanced Online Call Detail Data, a service that gives users on-line access to data regarding inbound and outbound switched calls. The information includes connect date and time, called and calling number, dialed 800 number, elapsed time and whether the call was completed.

Available in the first half of 1990, the service supports AT&T's 800, SDN, Megacom WATS and MultiQuest services.

AT&T Detail Manager, which currently tracks long-distance and PROWATS services, will be enhanced to monitor WATS, 800, Readyline, Megacom and Megacom 800 services by year end. The service provides users with call detail data on domestic and international calls. Users can set up customized Detail Manager reports or use predefined formats.

Charges vary, depending on the billing format selected, the service used and service usage.

AT&T also enhanced its Customer Traffic Data Reports (CTDR) to cover additional network services. CTDR, which previously supported only SDN, now supports Megacom, Megacom 800 and MultiQuest services.

The system enables users to view on-line data on previous-day traffic, daily and weekly summaries of traffic data, and reports on attempted calls and blocked calls.

Users can program certain traffic thresholds that, when exceeded, cause the system to generate a report. Data is stored up to 35 days for daily reports and up to four weeks for weekly reports.

CTDR is available to SDN users at no charge; AT&T has not finalized CTDR pricing for Megacom, Megacom 800 and MultiQuest services.

Finally, AT&T announced the Network Remote Access Monitoring System, which enables an SDN user to set thresholds on network remote access (NRA) calling. The service is designed to help users prevent fraudulent use of NRA, which enables employees to place calls over SDN nets from off-net locations such as airports and hotels.

The NRA Monitoring System is available at no charge for users that utilize AT&T's NRA calling option. For users who subscribe to SDN's Expanded System Management Service option, connect time for on-line access to the NRA monitoring system is included in the $100 per month charge.

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Calendar

Oct. 10-12, Minneapolis — 14th Conference on Local Computer Networks. Contact: IEEE Computer Society, c/o Ron Rutledge, Martin Marietta Energy Systems, Building 4500 N., M/S 6271, Oak Ridge, Tenn. 37831; (615) 576-7643.

Oct. 10-12, Dallas — Voice Traffic Engineering & Network Design. Contact: ICA, Suite 710, 12750 Merit Drive, Dallas, Texas 75251; (800) 464-4636.

Oct. 10-13, New York — INFO '89. Contact: Information Management Exposition & Conference, 999 Summer St., Stamford, Conn. 06905; (203) 964-0000

Oct. 10-13, New Orleans — The Challenge of Change. Contact: CompTel, 120 Maryland Ave. N.W., Washington, D.C. 20002; (202) 546-9022.

Oct. 11-12, New York — Wall Street Workstation Conference. Contact: Waters Information Services, 168 Water St., Binghamton, N.Y. 13901; (607) 772-8086.

Oct. 11-14, Washington, D.C. — Telephone Technology and Practice. Contact: George Washington University, School of Continuing Engineering Education, Washington, D.C. 20052; (202) 994-6106.

Oct. 12-13, Washington — Security and Local Area Network. Contact: Computer Security Institute, 360 Church St., Northborough, Mass. 01532; (508) 393-2600.

Oct. 12-13, New York — PC Data Bases Within a LAN Environment. Contact: New York University, School of Continuing Education, Division of Professional & Industry Programs, 575 Madison Ave., New York, N.Y. 10022; (212) 580-5200.

Oct. 12-14, Boston — Northeast Computer Show. Contact: Interface Group, Inc., 300 First Ave., Needham, Mass. 02194; (617) 449-6600.

Oct. 15-18, New Orleans — NRMA Retail Information Conference. Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001; (212) 244-8780.

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